APRIL 18, 1960

PAPER TRADE JOURNAL

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Precipitators Stay in Service With Careful Maintenance

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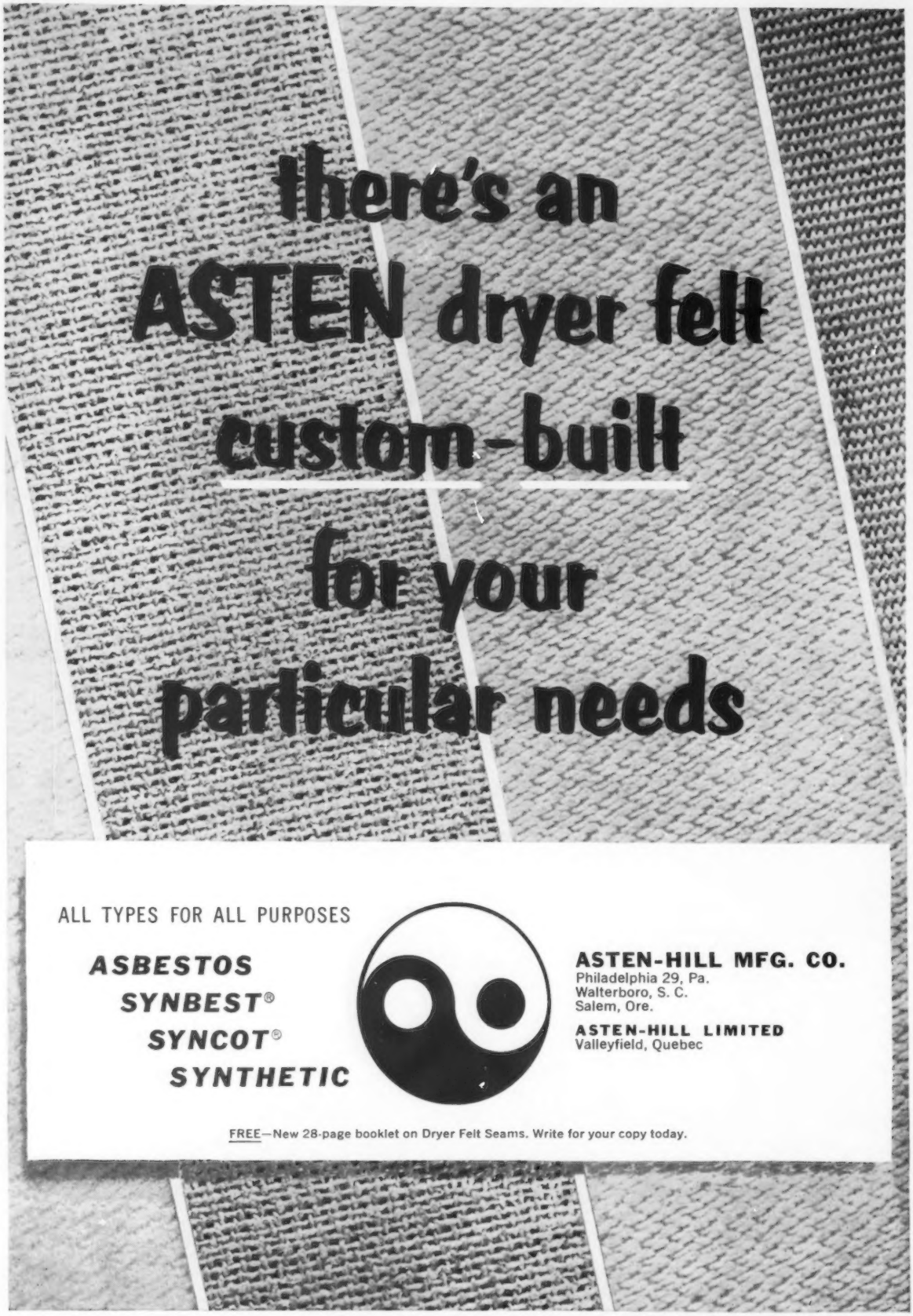

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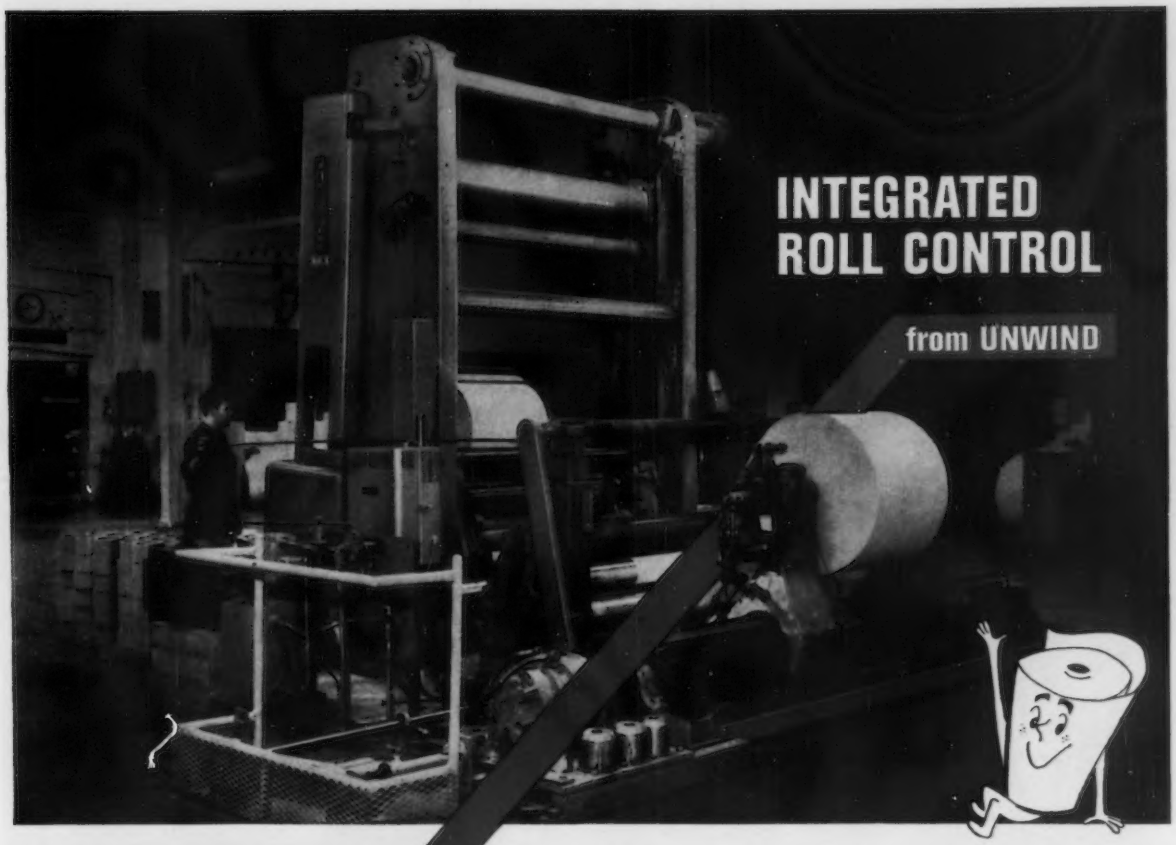

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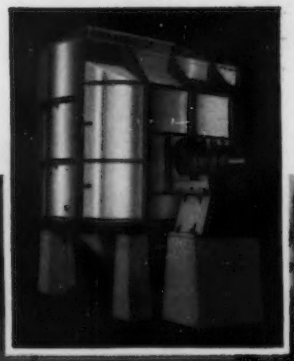

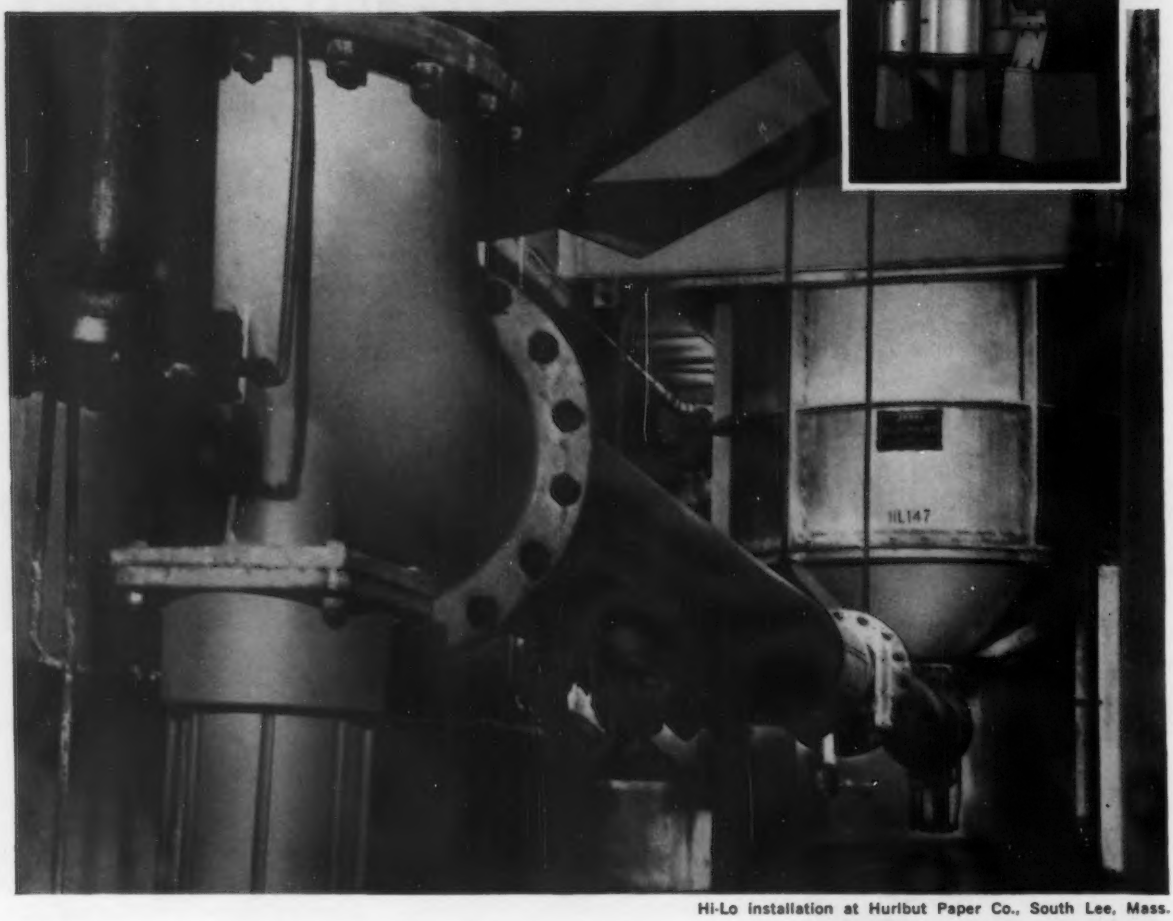

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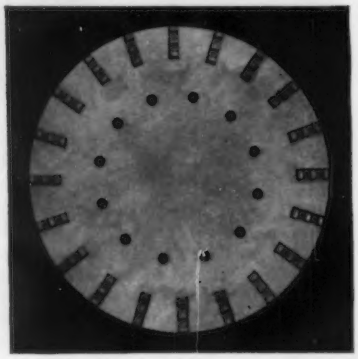

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PAPER TRADE JOURNAL

PUBLISHED WEEKLY SINCE 1872

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Week of APRIL 18, 1960 — Vol. 144, No. 16

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REMEMBER THESE DATES

May 23-25. TAPPI Coating Conference, Edgewater Beach Hotel, Chicago, Ill.

June 14-16. TAPPI Pulp Bleaching Conference, Edgewater Beach Hotel, Chicago, Ill.

June 7-9. PIMA National Meeting, St. Francis Hotel, San Francisco, Calif.

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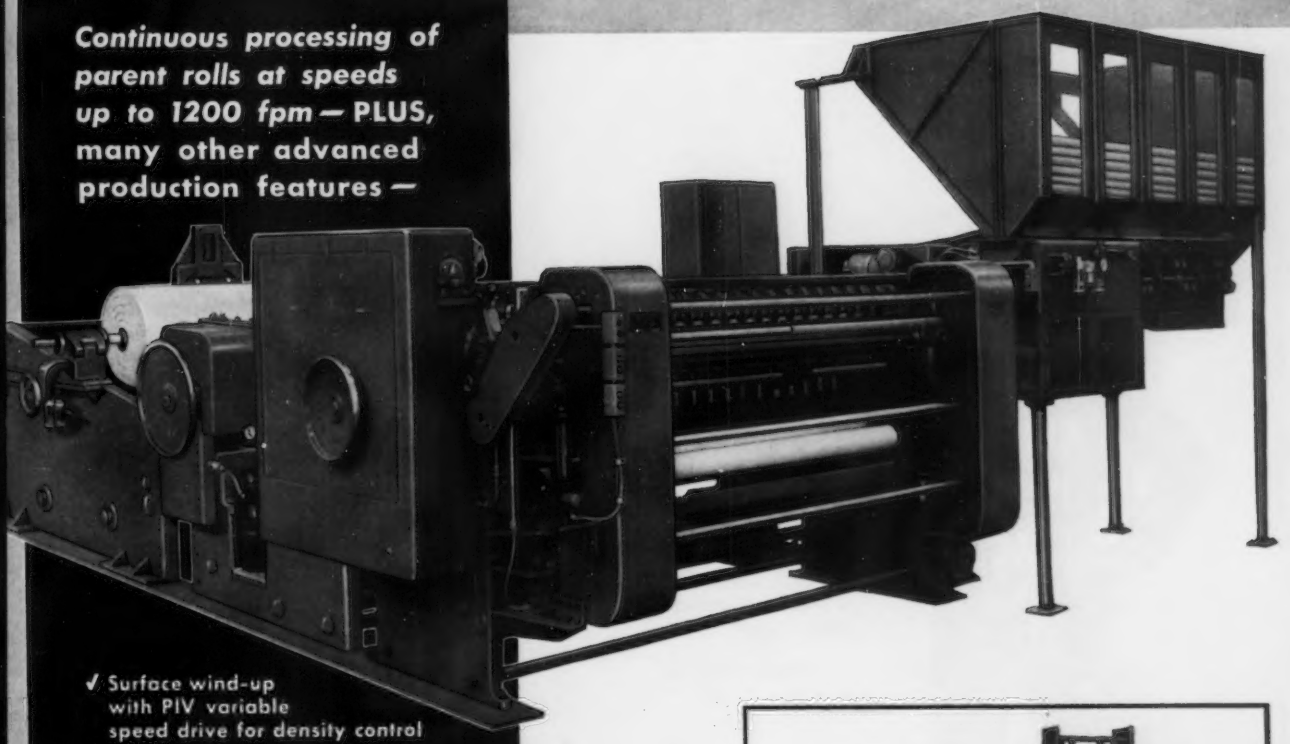

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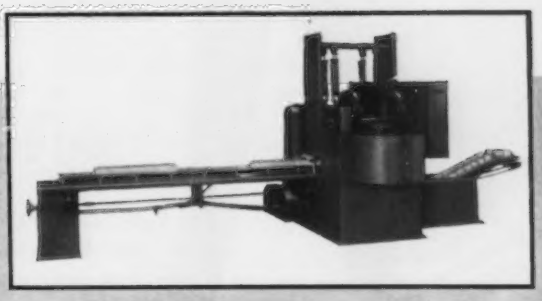

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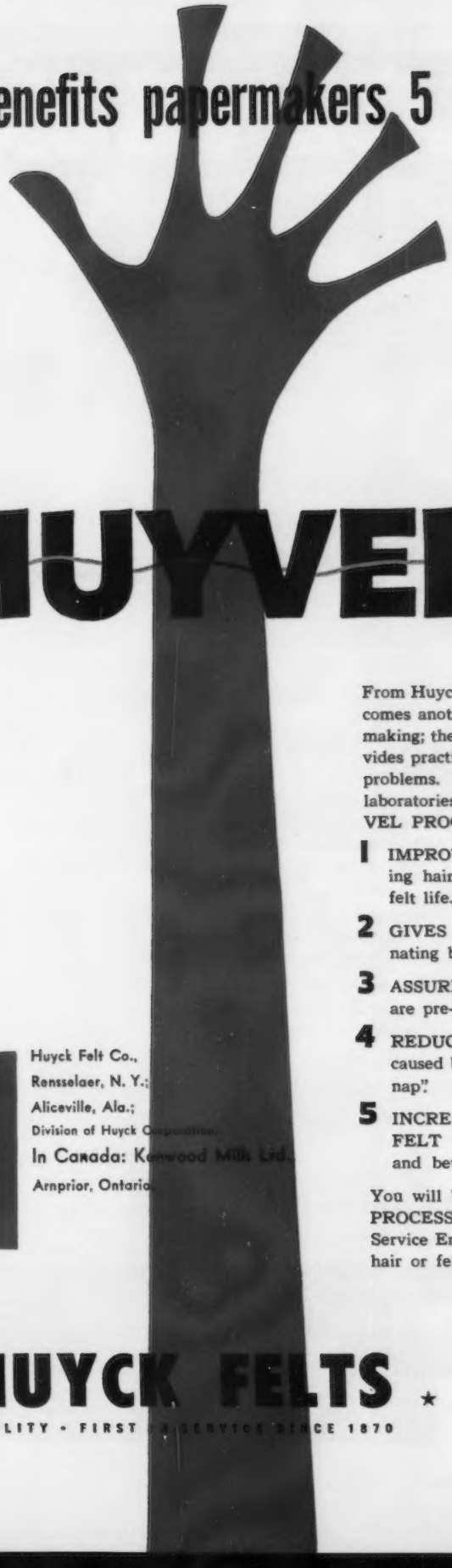

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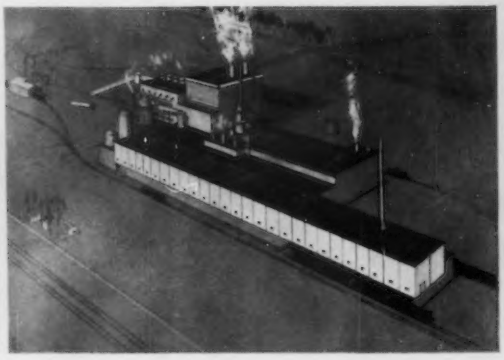
Waldorf-Hoerner unfolds spectacular expansion

FIRST STEP in the creation of Montana's first completely integrated pulp and board facility is shown in this photo of Waldorf-Hoerner's chemical pulp plant, completed in 1958.

ADDITION OF PAPER MILL, as it will appear when finished, is shown in drawing above. Building is 700 feet long and 70 feet wide.



...with advanced production techniques featuring

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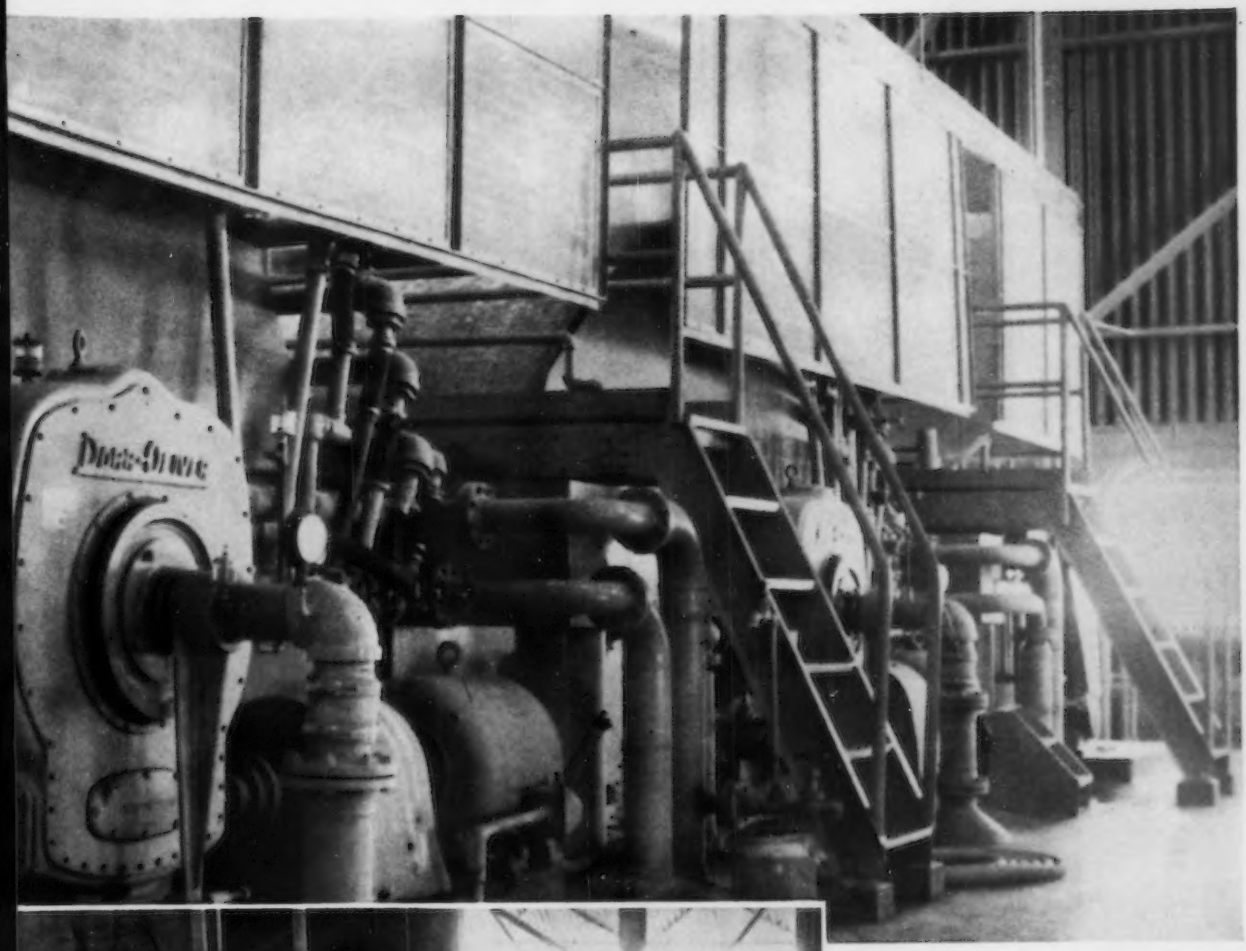
Rapid expansion, development of many innovations in production and the use of proven Dorr-Oliver systems and equipment are features of the spectacular operation of the Waldorf-Hoerner Paper Products Co., at Missoula, Montana.

The chemical pulp mill, producing unbleached kraft pulp, now includes an Oliver Brownstock Washing System with three 11½ ft. dia. x 20 ft. face single drum washers.

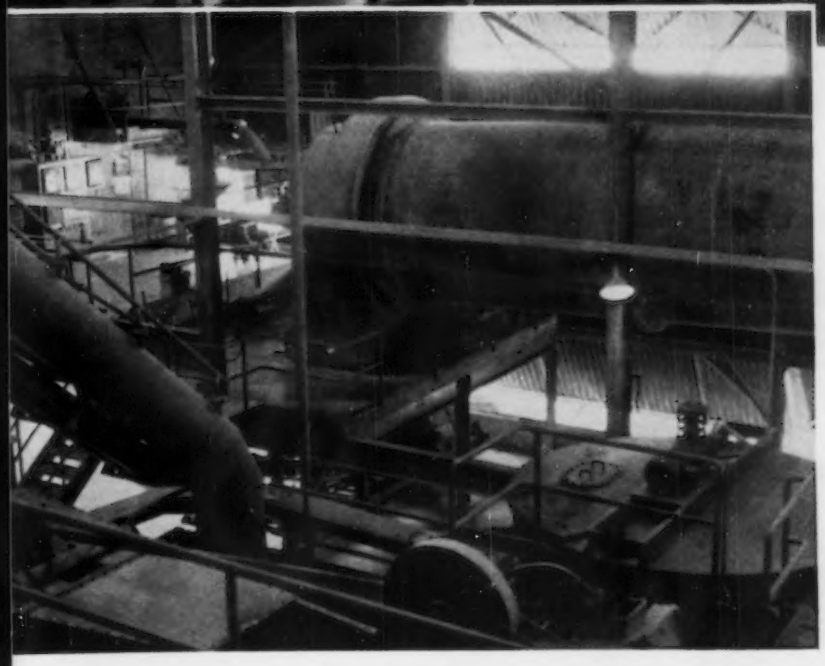
The Dorr Recausticizing System, of unconventional and simplified design, has both primary and secondary slaking, a single compartment Green Liquor Clarifier, unit-type White Liquor Clarifier, two-stage Lime Mud Washer and Dorr-Oliver Hot Lime Crusher. A new Lime Mud Washer is being added which, with minor rearrangement of existing equipment, will provide up to 700 TPD of liquor making capacity.

The Waldorf-Hoerner expansion program will utilize a complete Dorr-Oliver bleach plant and water treatment facilities to provide an integrated pulp and board operation.

For more information on the full range of Dorr-Oliver equipment and services for the pulp and paper industry, write to Dorr-Oliver Incorporated, Stamford, Connecticut.



OLIVER BROWNSTOCK WASHING SYSTEM comprises three 11½ ft. dia. x 20 ft. face drum washers, each operating single stage but capable of two-stage operation.



PART OF THE DORR RECAUSTICIZING SYSTEM is seen in this photo, looking across the slaker to the lime kiln. System is highly instrumented and incorporates advances in design which simplify operation and improve recovery.

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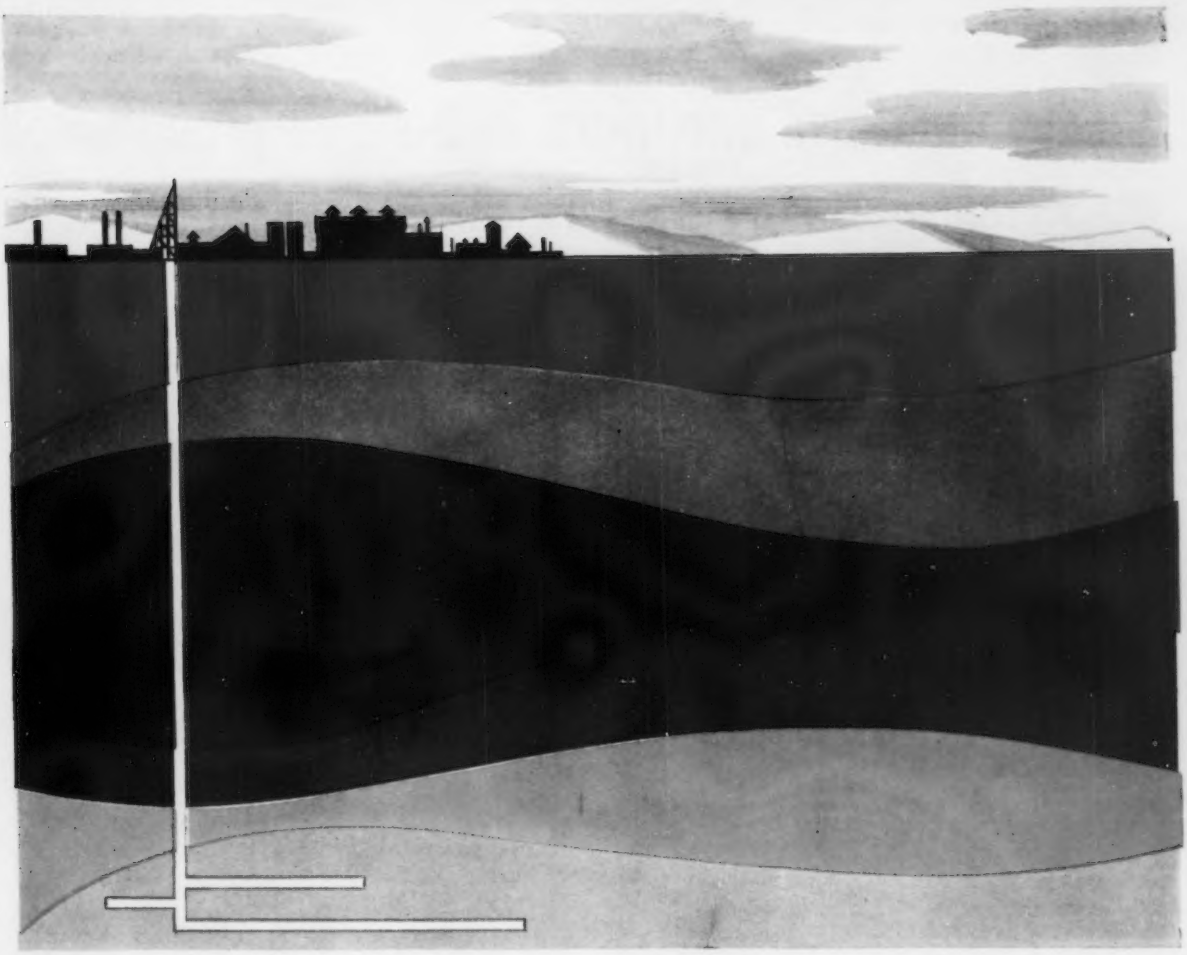

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One in a series of interviews with the men who are "Virginia"

"Many mills use our hydro in 2-stage groundwood pulp bleaching—and the new chip pulp demands a 2-stage bleach to reach the 75-plus brightness range"

Technical service representative Bob Barton and salesman Tom Allan, of Virginia Smelting Company, answer some questions on the merits of 2-stage bleaching of groundwood and mechanical pulp made from hardwood chips.

Thomas T. Allan and Robert W. Barton

Q What is the economical break point between 1- and 2-stage bleaching?

Mr. Barton—There is no hard and fast rule, because so many factors enter in—the brightness level desired, the type of pulp, the cost of the present bleaching operation. Generally, I would say the break came at around 12 brightness points. A peroxide stage *can* be pushed beyond this. But to get a really appreciable gain at reasonable cost requires 2-stage bleaching—that is, one of peroxide and one of hydro.

Mr. Allan—Sometimes a mill using one stage of peroxide will use its bleached pulp storage chest for touching up the pulp with hydro and pick up a couple of points economically. It's usually cheaper than using peroxide. You see, the peroxide hits a flat point in its brightness-concentration curve. At that point it often takes another whole percent of peroxide to pick up one brightness point. And the cost is around $4 extra. For the same cost, five points of brightness may be obtained with a second stage hydrosulfite bleach.

Q Is 2-stage bleaching a way to be sure of getting high brightness?

Mr. Barton—Yes. To get the highest possible brightness in groundwood paper, the 2-stage bleach is the surest and most economical method. It seems to me the specialty paper manufacturers—the firms making special printing grades—will eventually require 2-stage bleaching.

Mr. Allan—That's right. Usually the 2-stage operation is chosen because brightness is the primary consideration. However, I do know of one mill that's considering going to 2-stage because of cost. They reach about a 77 brightness with one stage of peroxide, but the costs sometimes go up to $25 a ton. With a second stage the savings would be really worth while. I would say that the mill that wants to hit up in the 75-plus range just about *has* to go to two stages. And the competitive situation is beginning to make more and more mills consider this possibility very seriously.

Q Why is 2-stage bleaching so important with mechanical pulps made from caustic pretreated hardwood chips?

Mr. Barton—Because this is about the only way to get a high brightness from these so-called caustic pulps. And I think the chip pulp is going to have much wider use, largely because of availability of hardwoods. This pulp can be bleached with chlorine, but its final brightness is unstable, and the stock gets a definite yellow tinge. The process is rather different from bleaching groundwood. You start by acidifying and washing the stock. It is then bleached at about 180°F with 3% peroxide, using more caustic buffer than with groundwood, to get a brightness of about 70 points.

Mr. Allan—This stock has a very low initial brightness—about 40, I'd say. With 3% peroxide you can pick up about 30 points. Then to get the final brightness up where it's wanted, the pulp is bleached in a second stage with hydrosulfite to give a final brightness close to that of a bleached chemical fiber.

Facts on 2-stage bleaching

Yours for a phone call, wire or letter. We will send you any data you want—or, if you say the word, a representative will call on you at your convenience to discuss your problems.

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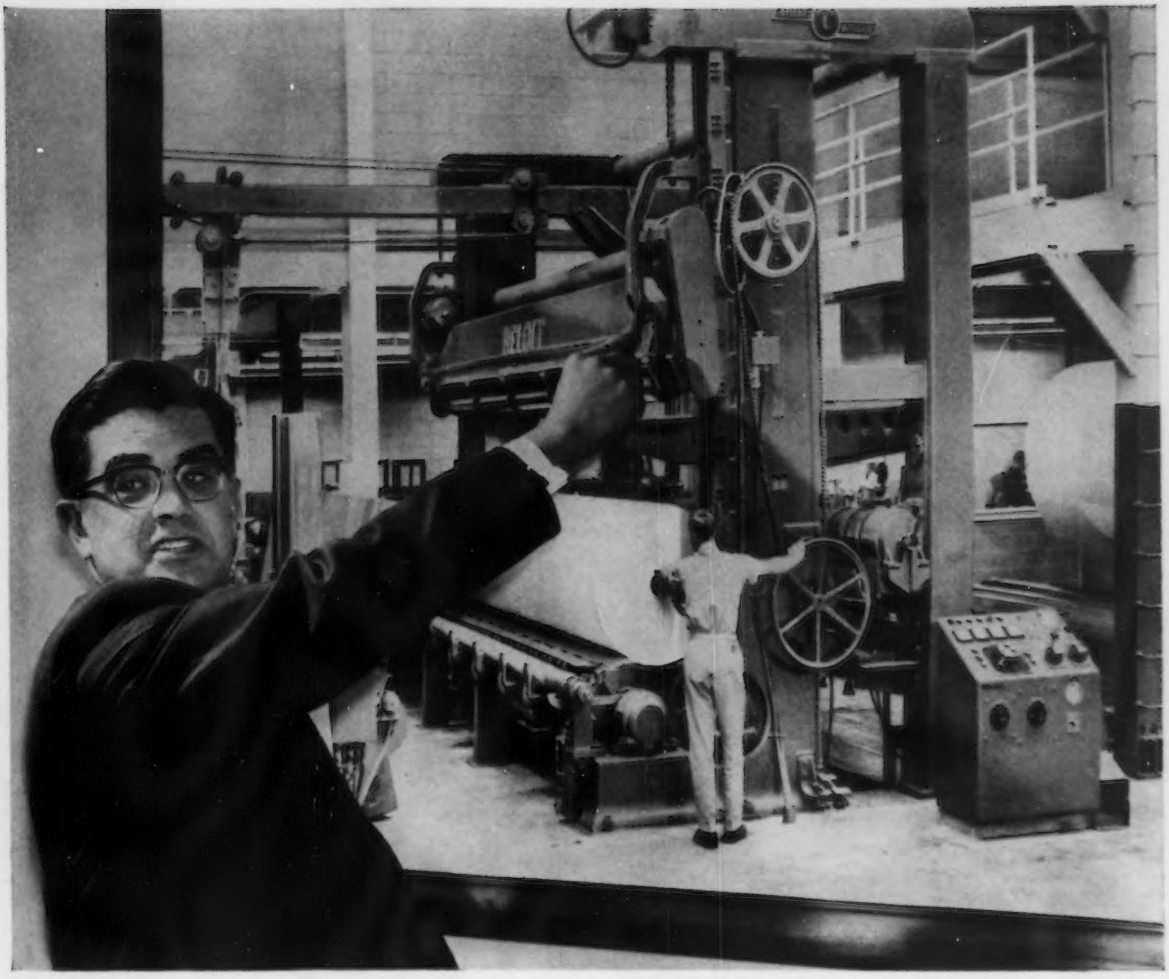

S. G. CHRISTENSEN

Beloit Eastern's "Mark" Markowski

When you want the facts on rewinding, a good man to know is W. D. Markowski, Manager of Winder Sales for Beloit Eastern Corporation. Beloit's leadership in the off-and-on machine winder field can be attributed to men like "Mark" and to their determination to settle for nothing short of the best. These men are experts in the design and manufacture of all types of winders, with practical mill applications their foremost consideration. They are happy to help you. Just drop a line to Beloit Eastern.

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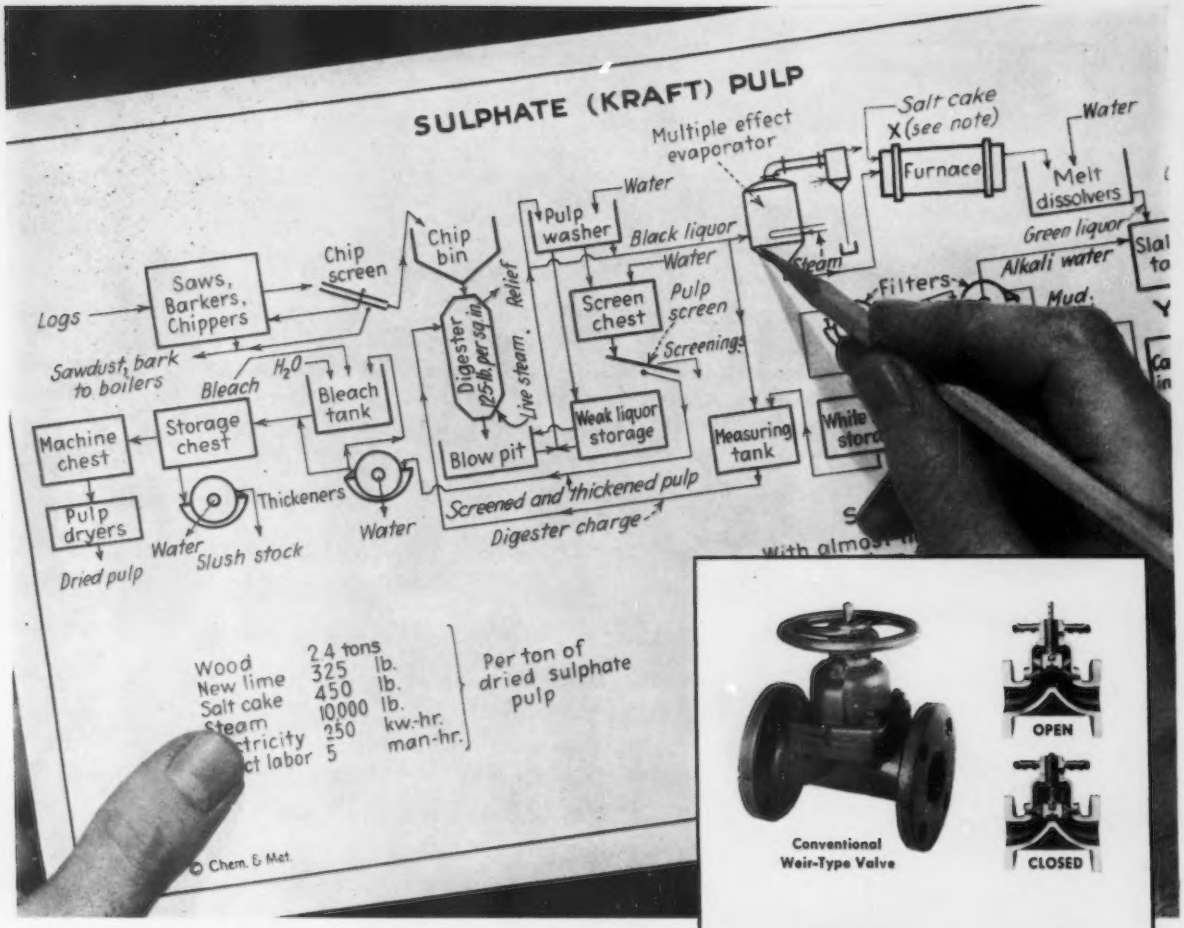
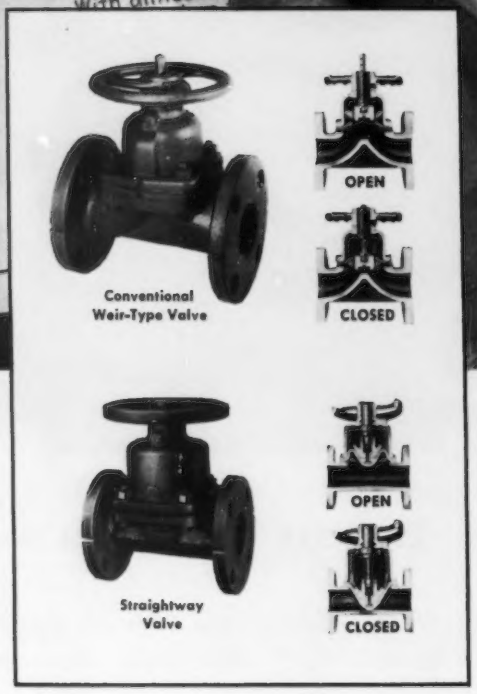
DOWNINGTOWN, PENNSYLVANIA





Papermen call it...

"The most versatile valve in the industry"

Grinnell-Saunders Diaphragm Valves serve a variety of uses. They efficiently handle compressed air and vacuum, corrosive chemicals, abrasive clay coatings. The resilient diaphragm lifts high in the open position to provide a smooth, streamline passage, which is leaktight to the atmosphere. When the valve is closed, the diaphragm seals tightly, even over fibrous particles and grit, to prevent leakage in either direction.

Particularly effective in handling slurries are Grinnell's *Straightway* Diaphragm Valves, which are exclusive with Grinnell. The patented straight-through body design, and the action of the diaphragm in rising completely into the bonnet, provide for free passage of the product without clogging. There are other advantages, too, with Grinnell *Straightway* Valves . . . such as keeping turbulence, pressure drop, and body wear to a minimum.

Grinnell-Saunders Diaphragm Valves are offered in a choice of body, lining and diaphragm materials. They are available for handwheel or power operation. For details, see Chemical Engineering Catalog or Sweet's Plant Engineering File — or write directly to Grinnell Company.

GRINNELL-SAUNDERS DIAPHRAGM VALVES

GRINNELL COMPANY, PROVIDENCE 1, R. I. • BRANCH WAREHOUSES AND DISTRIBUTORS FROM COAST TO COAST
PIPE FITTINGS • VALVES • PIPE HANGERS • PREFABRICATED PIPING • UNIT HEATERS • PIPING SPECIALTIES

Photo Courtesy of Gulf Oil Corporation

Gleaming Offset...on RHOPLEX-coated stock

This page was prepared for quality offset printing with a coating using a RHOPLEX 100%-acrylic emulsion binder. As a result, the surface is uniformly smooth. Halftone dots reproduce sharply, and colors print with superlative brilliance and fidelity.

RHOPLEX emulsions are excellent binders for coating not only paper, but paperboard as well. In fact, the excellent results produced by RHOPLEX coatings on both bleached and unbleached kraft board have been a boon to package design. The superb printing qualities conferred by RHOPLEX emulsions spark up colored printing on cartons for cigarets, beverages, frozen foods, and cosmetics. In coating paperboard, the low viscosity of RHOPLEX coatings permits coating application at exceptionally high solids, for maximum whiteness and hiding power. Other advantages include excellent flexibility of the dried coating, outstanding water resistance, calenderability at lower-than-average pressures, and very good adhesion. Write for our 16-page booklet "RHOPLEX Acrylic Emulsions in Paper Coatings" for formulating information and technical data on RHOPLEX B-15 and RHOPLEX B-60A coatings for printing papers and paperboard.

RHOPLEX *is a trademark, Reg. U.S. Pat. Off. and in principal foreign countries.*

Chemicals for Industry

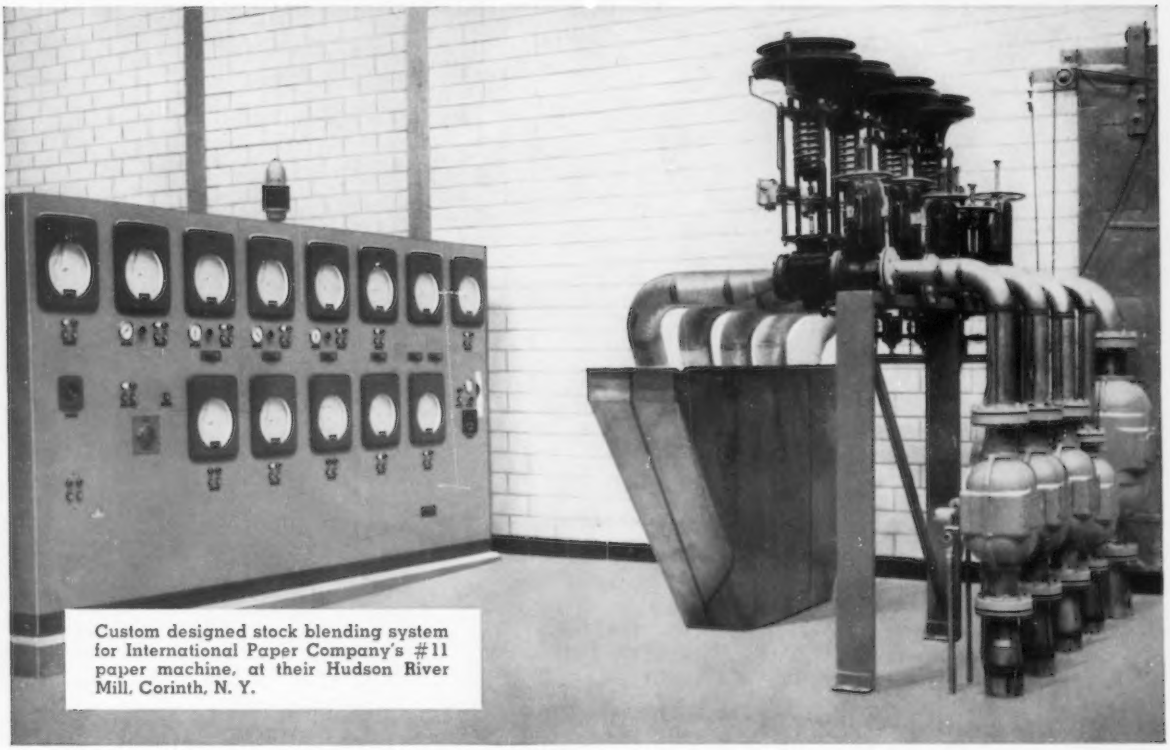
ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

RHOPLEX

You're looking at the complete pulp stock blending system for a high speed paper machine



Custom designed stock blending system for International Paper Company's #11 paper machine, at their Hudson River Mill, Corinth, N. Y.

Foxboro Magnetic Flow Meters blend all pulp stocks accurately, continuously

Set the proportions for stocks . . . dyes . . . additives and walk away! That's the procedure for changing furnish grades on the Foxboro Stock Blending System at International Paper Company.

With this system, one man at a central panel can blend all 5 pulp stocks — as well as additives and dyes — accurately and continuously.

Each stock percentage is set on its own direct-reading dial — especially selected to meet International Paper's specific operating requirements. Settings are easier — more convenient — more accurate. And the entire system automatically adjusts for changes in machine demand, while all proportions are held exactly constant.

And since all stock measurements are made by the unique Foxboro Magnetic Flow Meter — the meter with no flow restrictions — there is nothing to plug up . . . nothing to interfere with high sustained accuracy of pulp flow measurement.

With Magnetic Flow Meters from 1/10" to 12" and larger, the Foxboro Stock Blending System will handle any number of pulp stocks, dyes, and additives. Every system is custom designed for each mill's own paper-making requirements — resulting in more consistent furnish — higher production. Your mill can benefit from this maintenance-free, space-saving system, too. Write for new engineering data sheet. **The Foxboro Company, 2311 Norfolk Street, Foxboro, Mass.**

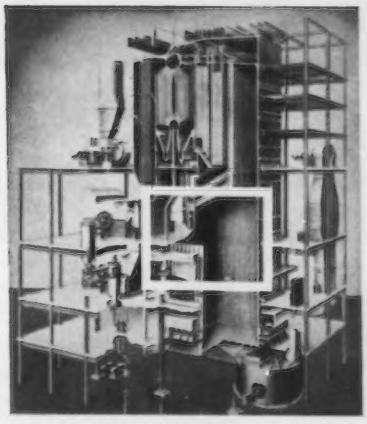
FOXBORO
REG. U.S. PAT. OFF.

FIRST IN FLOW CONTROL

How Tangential Air Improves Furnace Performance

In the C-E Recovery Unit, secondary air is introduced tangentially above the liquor sprays by an exclusive C-E method that intimately mixes high velocity air with unburned gases. Combustion is rapid and complete. Since the tangent jets of air give the gas mixture a turbulent, spiralling motion, longer travel within the furnace results. This eliminates stratification and reduces the amount of unburned char entering the screen and superheater zones. Temperature of exit furnace gases is generally lower and more uniform, too – minimizing slag deposits.

C-E will be glad to discuss with you these and other advantages of *tangential* secondary air – which add up to greatly improved furnace performance.



The C-E Recovery Unit. Section of illustration has been enlarged to show the upward-spiralling gas path produced by C-E's exclusive *tangential* introduction of secondary air. Inset (above, left): diagram of tangent principle.

COMBUSTION ENGINEERING

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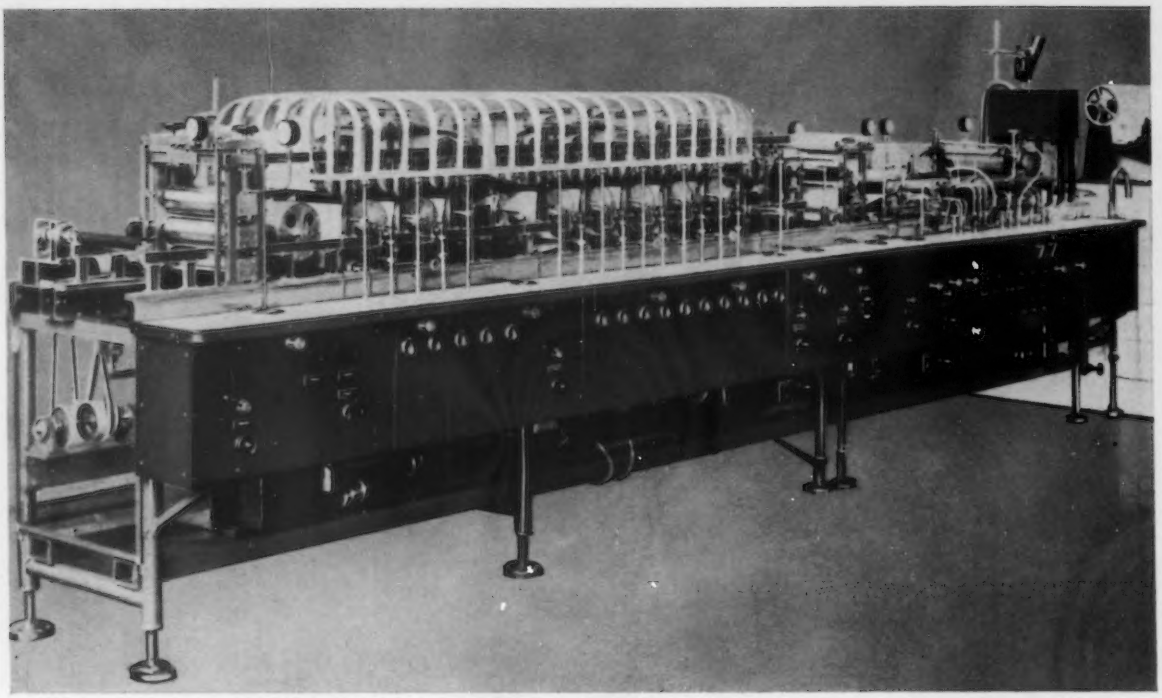
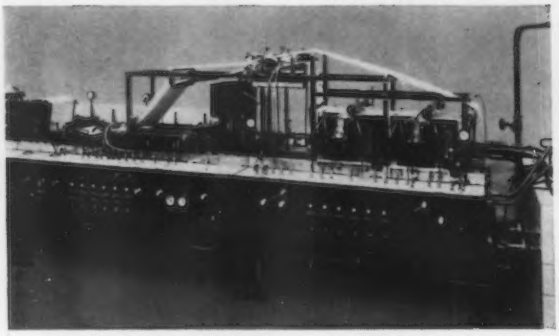
Canada: Combustion Engineering-Superheater Ltd.

C-258

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE



NEW P&W MIDGET FOURDRINIER PAPER MACHINE



The standard P&W Midget Fourdrinier model can also be operated in combination with miniature cylinder molds to provide more versatile sheet formation experiments.

Present users of the P&W Midget Fourdrinier Paper Machine include: West Virginia Pulp & Paper Co. • U. S. Dept. of Agriculture—Peoria Lab • Nat'l Bureau of Standards—Washington • Hurlburt Paper Company • E. I. Dupont de Nemours & Co., Inc. • R. J. Reynolds Tobacco Company • Forest Products Lab.—Philippines • Forest Products Lab.—Pakistan • U. S. Naval Laboratory.

Permits Precise Small-Scale Test Runs of a Wide Variety of Paper Formulations

As little as 5 lbs. of stock is all it takes to start the P&W Midget Fourdrinier making a continuous sheet of paper which can be successfully duplicated on a full-size paper machine. Such test runs effect a significant saving in raw materials, manpower and production machine time.

The P&W Midget Fourdrinier is also of special interest and value to educational institutions and technical laboratories. It is safe, clean and easy to operate. One man only is needed to adjust temperatures and pressures for a wide variety of paper making experiments.

SPECIFICATIONS

Paper Quality—Comparable to full-size Fourdrinier products
Weight of paper—12-120 lbs.
Output—up to 3.3 lb./hr.
Speed—2-8 ft./min.
Overall length—14 ft.
Overall width—33 in.
Working width—9 in.

Write for full descriptive literature.

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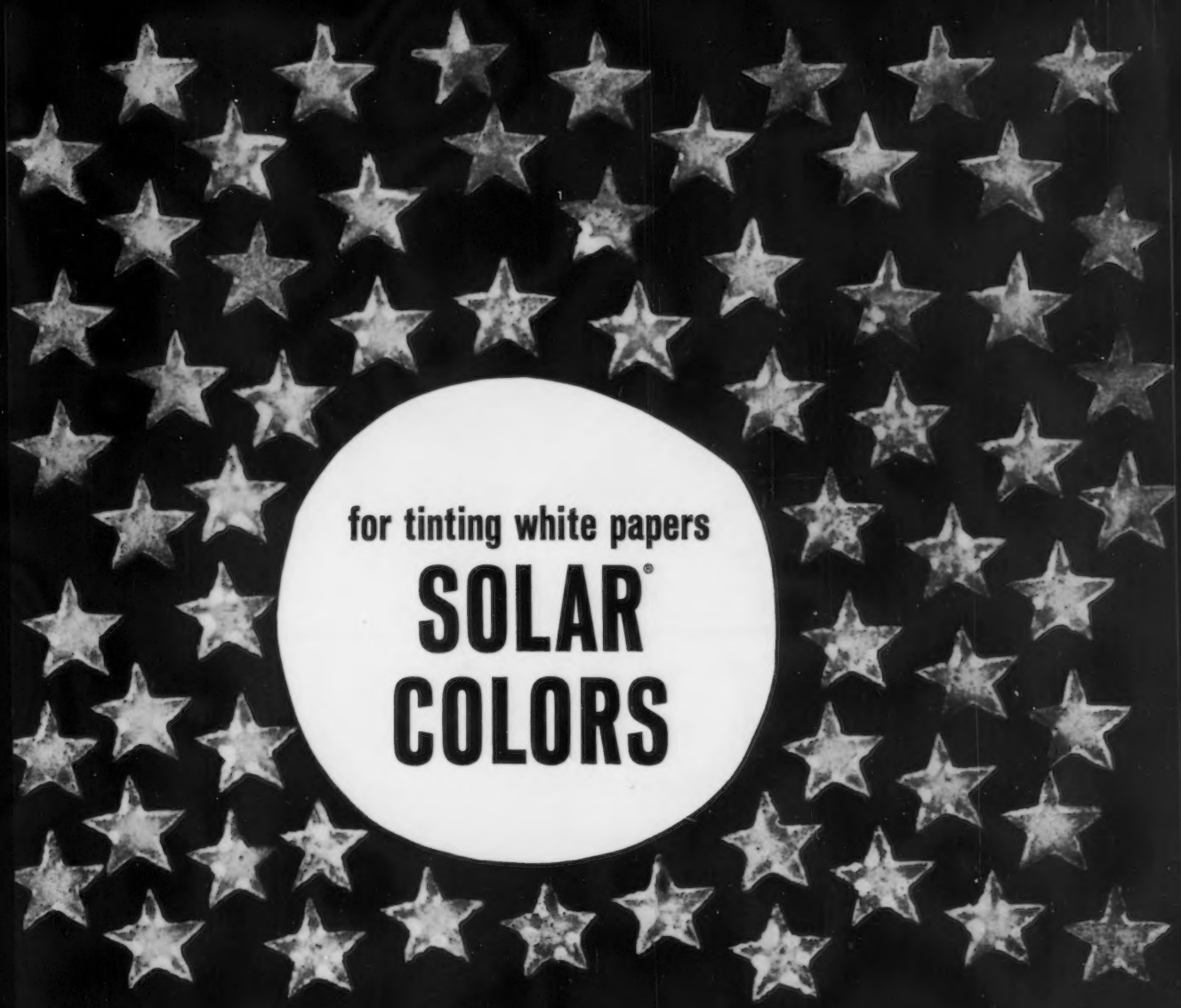

for tinting white papers

SOLAR® COLORS

PROVIDE A FULL RANGE OF EYE-APPEALING SHADES

Easy-to-handle because of non-dusting and non-caking properties, these economical water-dispersible pigments also provide the outstanding advantages of: maximum brilliance of shade • excellent light fastness • uniform dispersion • quick wetting-out • process stability

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Solar Blue BMN 57-5612	Solar Blue RM Liquid 57-2019	Solar Green BMN 67-3012
Solar Blue DM 57-3692	Solar Blue TTN 58-5692	Solar Pink BT 38-5012
Solar Blue GTN 58-6612	Solar Blue TMN 57-5692	Solar Pink BM 37-5012
Solar Blue GMN 57-6612	Solar Blue UTN 58-6692	Solar Violet RTN 48-3612
Solar Blue RTN 58-2612	Solar Blue UMN 57-6692	Solar Violet RMN 47-3612

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GENERAL DYESTUFF COMPANY
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PORTLAND, ORE. • PROVIDENCE • SAN FRANCISCO • IN CANADA: CHEMICAL DEVELOPMENTS OF CANADA, LTD., MONTREAL

SOLAR COLORS MANUFACTURED BY GENERAL ANILINE & FILM CORPORATION ARE SOLD OUTSIDE THE UNITED STATES, BY DISTRIBUTORS ALL OVER THE WORLD, UNDER THE TRADENAME "TINTOFEN."®

100- or 150-lb. cylinders with I. C. C. approved valves or one-ton containers in 6, 8 or 10-ton lots on special trucks.

by truck

100- or 150-lb. cylinders; one-ton containers in 15-ton multi-unit tank cars; single-unit tank cars.

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get liquid chlorine your way

It's the handling and shipping and technical skills that make the big difference in *liquid chlorine.* Diamond is not only one of the largest producers, but delivers chlorine the way that makes you glad you said, "Diamond." Where you want it . . . when you want it . . . as you want it.

Barges with capacity of 600 tons, on America's principal inland waterways, bring big users lowest possible shipping costs.

by waterway*

*From plants at Muscle Shoals and Houston

Learn more about getting *liquid chlorine your* way. Send for the "Diamond Chlorine Handbook." Diamond Alkali Company, 300 Union Commerce Bldg., Cleveland 14, Ohio.

Diamond Chemicals

ALLIS-CHALMERS

This maintenance man's toolbox sums up the story of

the simplest process in paper making:

maintaining the products of Allis-Chalmers

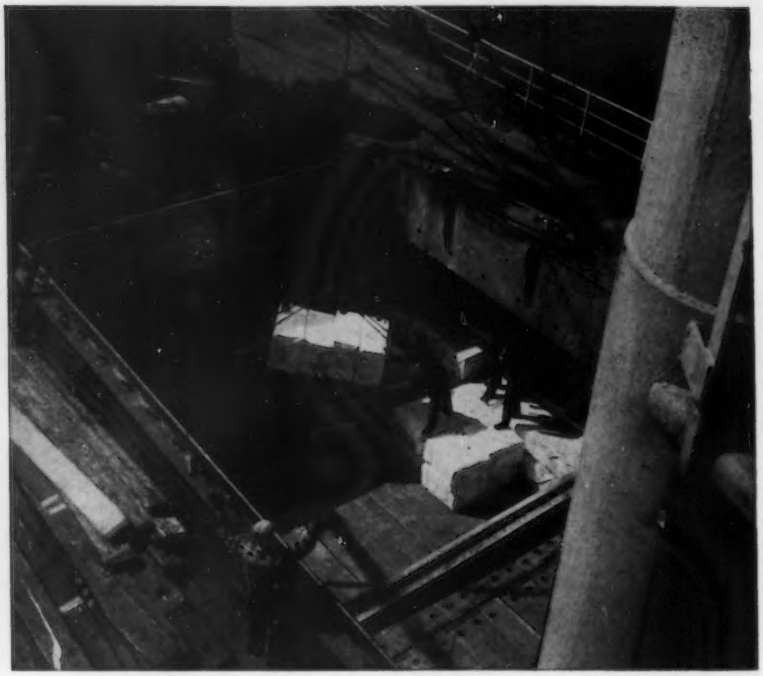
Even the standard products that Allis-Chalmers builds for the Pulp and Paper Industry are designed for the industry's special needs . . . and designed so routine inspection and maintenance are simply, quickly done.

And from no other manufacturer can you match the range of equipment available and benefit from Allis-Chalmers unit responsibility. Listed at right are some of the Allis-Chalmers products built to serve you economically throughout the plant—from pulp to finished paper products.

For service that matches the quality of the equipment, call the A-C representative near you. Or write ***Allis-Chalmers,*** *Milwaukee 1, Wisconsin.*

"Teamed" Equipment from A-C . . . Electrical Generation and Distribution Equipment. Pumps, Motors, Motor-Generators, Motor Control, Screens, Compressors, Vacuum Pumps, Water Conditioning, Lime Kilns, and Material Handling Equipment. A-1285

BALES OF GASPESIA BLEACHED SULPHITE PULP for export are loaded into the hold of a 10,000-ton ocean-going vessel.



THIS IS GASPESIA SULPHITE COMPANY

Now available at Gaspesia:
WONDERWHITE
with Chlorine Dioxide

HERE'S WHY IT WILL PAY YOU TO BUY PULP FROM GASPESIA

At Gaspesia we enjoy many natural advantages. Northern spruce and balsam fir—slow-growing, long-fibered, best for sulphite pulp—are the sole sources of the pulp you receive from us. Our access to nearly a million acres of these fine trees assures you a dependable, top-quality supply.

Gaspesia's continuous flow bleaching, regulated by the most advanced control methods, applies automation to every possible operation. Uniform quality —so vital to your finished product—results from Gaspesia's superior equipment, operated by men who have spent lifetimes acquiring the "feel" of pulp making. They confidently urge you to try our pulps.

Gaspesia pulp has earned endorsement for many uses—*from papeteries to boxboard to tissues*. Among its characteristics: high opacity, high brightness, good strength, excellent bulk and trouble-free working properties.

Location on the Gaspé Coast, within easy reach of waterways to the whole world, affords low-cost water transportation, practically ice-free, to nearly every major market area. Shipping time to Europe is about half that from our Pacific Coast. Transcontinental rail systems speedily deliver carload quantities to both the United States and Canadian markets.

Have you tried Gaspesia?

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PJT | PAPER TRADE JOURNAL

WEEK OF APRIL 18, 1960

Bowater-Scott Establishes Second European Affiliate in Italy

A second European affiliate of Bowater-Scott Corp., Ltd., of England was established in Turin, Italy, on April 7 by the formation of a new company to be known as Burgo Bowater Scott S. p. A. The new organization will be jointly owned by Cartiere Burgo S. p. A., a leading Italian paper manufacturer, and Bowater-Scott.

Bowater-Scott is owned equally by Scott Paper Co. of Chester, Pa., and The Bowater Paper Corp., Ltd., of London, England.

The Italian company and the British company will have equal representation on the new company's eight-man board of directors with Signor Mansueto Ravizza, board chairman of Cartiere Burgo, serving as board chairman of the newly formed company.

For the present Burgo Bowater Scott will convert large "parent" rolls, imported from the Bowater-Scott plant at Northfleet, England, into sanitary paper products such as facial and toilet tissues, paper towels and napkins.

These products for both home and industry will be marketed in Italy and southern Europe. Included in the new company's future plans is the installation of a modern high-speed paper machine to produce its own parent rolls of tissue.

A year ago Bowater-Scott made a similar arrangement with one of Belgium's foremost paper manufacturers, Papeterie de Belgique.

Champion Installs Plastic Extrusion Coating Equipment

The Champion Paper and Fibre Co., Hamilton, Ohio, has entered the field of plastic-coated papers and plastic films. At its plant at Waynesville, N. C., the company is installing equipment for plastic extrusion coating of its papers. The extruder portion of this equipment permits the extrusion of plastics such as high density polyethylene, nylon, polypropylene, Teflon, vinyls, polystyrene and others. With the coating portion, Champion can plastic-coat paper in widths up to 85 inches and with a controllable range of coating weights from 1⅓ pounds to 24 pounds per 1,000 square feet. The coating line can be operated at speeds up to 1,000 feet a minute. And large rolls, 85 inches wide and 84 inches in diameter can be produced.

Champion, enthusiastic about the potentialties of the market for this product, point out it has many superior qualities over present methods of packaging such diverse items as dairy products, high acid content liquids, pharmaceuticals, dried foods, frozen foods, cereals, and even cigarettes.

Construction Starting on Menasha's North Bend Mill

Construction of a causeway in Coos bay to provide access to the sand dunes industrial area site of the Menasha Wooden Ware Corp.'s first pulp and paper mill in Oregon is nearing completion. Working day and night shifts, crews operating a dredge in the bay have built almost one mile of the causeway with material lifted from the bay. At the same time other workers operating huge earth-hauling equipment are busy filling and leveling the site.

Building of the 125-ton per day pulp and paper mill will begin this spring, according to Ernest C. Manders, who will manage Menasha's North Bend pulp and paper operation. "We hope to be ready to receive machinery by December, and to produce our first Oregon pulp and paper early in the summer of 1961," Mr. Manders said.

The plant will be located at tidewater near an area of the dunes where Pacific Power & Light Co. conducted extensive geological explorations in developing a new source of fresh water suitable for expansion of forest industries in timber-rich Coos county. As a result of Pacific Power's five year's of investigations and test pumping from its initial wells, the Menasha, Wis., company decided to expand its North Bend operations. The mill will create about 100 new jobs. The paper will be used at Menasha's Anaheim, Calif., corrugated paper box plant, and by other Pacific coast corrugated box manufacturers.

Sweden to Get New Plant For Papermaking Chemicals

Hercules Powder Co. has announced formation of a wholly owned subsidiary in Sweden, which will build a plant for the production of chemicals for the paper industry.

Headquarters for the new company, which will be known as Hercules Kemiska Aktiebolog, will be in Gothenburg. Although no location for the plant has yet been announced, the company said that it "will be strategically located to best serve the paper industry."

The new company will be headed by Prosper F. Neumann who will be managing director. Mr. Neumann has been manager of rosin size sales for the Paper Makers Chemical Dept. of Hercules for the past four years, and prior to that was the department's manager of technical service.

The new plant will be designed to produce a complete line of chemicals for the Swedish paper industry. However, at the beginning of operations, production will be devoted entirely to the manufacture of rosin size, both regular and fortified.

Canco Research Center To Be Expanded

Plans to expand the American Can Co. Canco Division's Research Center, Barrington, Ill., have been announced by Kenneth W. Brighton, research vice president of the Canco Division.

Nearly 10,000 square feet will be added to the south building with extensions east and west. This is the first major addition to the Research Laboratory since the original construction was completed five years ago.

Its original layout of 100,000 square feet was designed to facilitate future expansions.

The new addition will be required to accommodate additional prototype and experimental equipment used in the development of containers. Dr. Brighton said the general areas of exploration would include new methods and processes for manufacturing containers of steel and ferrous alloys, aluminum, plastics, paper, and combinations of such materials.

New Information on Cellulosic Solutions

Most insoluble particles in cellulosic solutions are smaller than has previously been believed, according to Dr. Lawrence R. Parks and Karl A. Jubergs of Buckeye Cellulose Corp. The majority of insoluble particles are less than 15 microns in size—not more than 15 microns as once thought by most cellulose chemists, Dr. Parks reported at the 137th national meeting of the American Chemical Society.

This new information was developed through extensive use of an electronic counter, he said. Until now, most of the study of insoluble particles has been done with equipment such as microscopes or photoelectric devices which depend on differences in the optical properties of the particles and the solution.

The Buckeye findings suggest that further research will enable manufacturers to produce improved products such as stronger yarns or clearer films. The size, structure and concentration of insoluble particles are important to Tyrex tire cord, rayon and cellophane, and to photographic film and other cellulose derivatives because of the effect the particles may have on processing and end-product properties.

According to Dr. Parks, the Buckeye findings bear out the belief that particle concentration is related to the pulp, the process by which the derivatives are prepared, and the filter material through which it is passed. In addition to the particle number, Dr. Parks said, it was found that there are other critical but undetermined properties of the particles, the study of which will probably be facilitated by use of the electronic counter.

Dr. Parks said that to date Buckeye has used the electronic counter for study of insoluble particles in both viscose and cellulose acetate solutions. In the United States, the viscose and cellulose acetate processes account for over 80 per cent of the consumption of dissolving pulps. He said that the new technique is also applicable to other derivatives, such as nitrocellulose and cellulose ethers. In line with the study of cellulosic solutions, the electronic counter has proven to be an excellent tool for the measurement of filter media effectiveness.

U. of Maine Announces Open House Program

The annual Open House and Research Days program presented by the University of Maine in cooperation with the Pulp and Paper Foundation will be held April 29 and 30.

Planned for Friday, April 29, are laboratory demonstrations, a luncheon, and panel discussions on the university campus, and a dinner meeting at the Penobscot Valley Country Club. Laboratory demonstrations will continue on Saturday, and there will be opportunity for informal consultation with staff members and students.

Western Krafts New Research Lab. Completed

Completion of a new $100,000 research laboratory at Albany, Ore., by Western Kraft Corp. has been announced. The new facility is designed to test and develop new and improved packaging as well as pulping and papermaking processes.

Felix Hammack, formerly assistant technical director at the Crossett Paper Mills, Crossett, Ark., has been named technical director in charge of laboratory operations. He will be assisted in the container development and testing section by Robert Campbell and in component development by Edward Kirkpatrick, both formerly project chemists for Western Kraft.

UB-C Stockholders Approve River Raisin Merger

Stockholders of Union Bag-Camp Paper Corp. approved a proposal to merge with River Raisin Paper Co. at the annual meeting on April 12. Stockholders of River Raisin had approved the merger late last month.

The surviving company will be Union Bag-Camp Paper Corp. and River Raisin will be operated as a division of the company under its own name. Arthur J. Goetz, executive vice president of River Raisin since 1951 will head the division. Charles L. Wood, chairman and president, will retire but will continue to serve as a consultant.

Folding Paper Boxes Show Rise in Shipments

Folding paper box shipments during March were up 3.4 per cent in dollar volume and up three-tenths of a per cent in tonnage over the same month last year, it was announced by the Folding Paper Box Ass'n. of America. Shipments during the first three months of this year were up 2.8 per cent in dollar volume and remained even with the first quarter of 1959 in tonnage.

Industry volume for the quarter was $231 million, up $5,500,000 over the first three months of 1959. The same number of tons, 573,000, were shipped during this quarter in the same period last year.

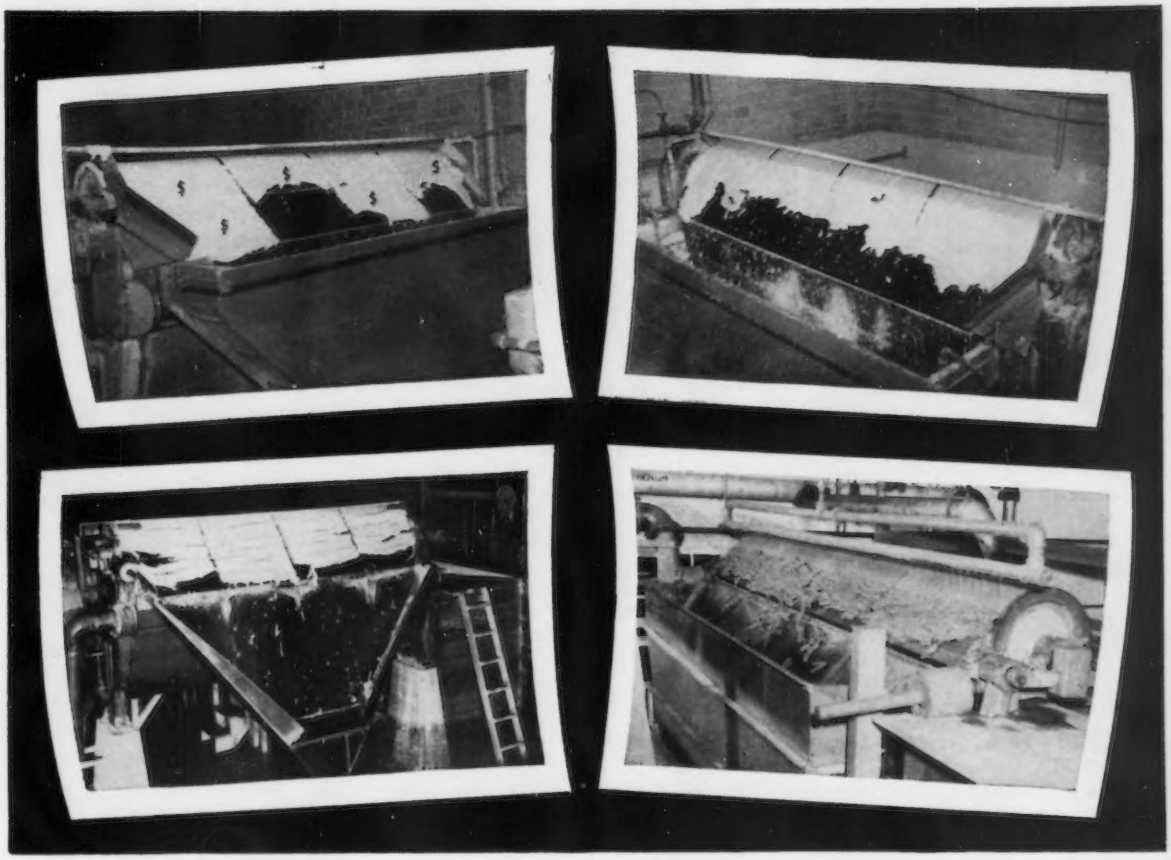
Paper and Paper Board Production

The American Paper and Pulp Association reported the ratio of the United States paper production to mill capacity for the week ending April 2, 1960, at 97.3 per cent compared with 99.5 per cent, revised for the preceding week. The ratio was 90.4 per cent for the corresponding week a year ago.

The National Paperboard Association reported the paperboard production ratio for the week ending April 2, 1960, at 91 per cent, compared with 93 per cent for the preceding week and 89 per cent for the corresponding week a year ago.

(Detailed statistics on page 61)

Can You Picture Profitable Savings Like These in Your Mill?



With the Bird Save-All on the job, you not only enjoy this visible evidence of the saving of valuable fibres but you have the satisfaction of knowing that this fibre is recovered at the lowest possible net cost per ton. Every pound of it that's rescued from the sewer contributes positive profit instead of negative shrinkage.

Let us prove how quickly the Bird Save-All can pay for itself in your mill.

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THE BIRD SAVE-ALL

PAPER PEOPLE

Mercer Reynolds, Jr.

W. D. Munson

Southern Chemical Elects President

Mercer Reynolds, Jr., has been elected president of Southern Chemical Cotton Co. filling the vacancy created by the untimely death of W. D. Munson. Mr. Reynolds, son of the founder of the company was formerly executive vice president. Mr. Munson, 62, died suddenly while vacationing with his wife in Miami Beach, Fla. He had been with the company since 1924.

The firm, located in Chattanooga, Tenn., a leading producer of cotton linter pulps for over 30 years, late in 1959 began production of specialty papers on a new machine.

Buckeye Cellulose Creates New Post

Buckeye Cellulose Corp. has appointed Robert E. Cannon to the newly created post of sales manager and Luther P. Gause as manager of paper pulp sales, succeeding Mr. Cannon.

As sales manager, Mr. Cannon will be responsible for the sales of the company's products in Europe and general supervision of Buckeye's domestic paper industry sales. Mr. Gause will direct the sales of the bleached kraft paper pulp manufactured at Buckeye's Foley, Fla., mill and the paper grades of cotton linter pulp made at Memphis.

Mr. Cannon joined Buckeye in Memphis following graduation from the Georgia Institute of Technology with a mechanical engineering degree in 1951. He has held several positions with Buckeye, serving most recently as manager of paper pulp sales and as paper mill superintendent of the company's Foley plant.

Mr. Gause joined Buckeye in Memphis in 1952, after receiving his B.S. degree in chemical engineering from the University of Alabama. His experience with the company includes positions with the process development, technical service, and sales groups.

R. E. Cannon

L. P. Gause

Wilson Joins Rayonier Technical Service

J. Harvey Wilson, formerly technical superintendent of Celanese Mexicana, S. A. Zacapu, Mexico, has joined the technical service of chemical cellulose producer Rayonier.

Weyerhaeuser Names McEwen Manager at Everett

John M. McEwen has been named manager of the Weyerhaeuser Co.'s pulp and paperboard division at Everett, Wash.

Dr. McEwen has been technical director of the Tacoma, Wash., company's kraft paper mill at Everett since it began operation in 1953.

He is chemical engineer graduate of Ohio State University and earned his M.S. and Ph.D. degrees at the Institute of Paper Chemistry, Appleton, Wis.

A. L. Burns

Westvaco Names Bentley To New Position

Robert L. Bentley, Kraft Division manager of West Virginia Pulp and Paper, North Charleston, S. C., has announced the promotion of Alan Lincoln Burns to the new position of administration manager. In addition to his present duties as industrial and community relations manager, Mr. Burns will assume the responsibilities of commercial manager. Mr. Burns got his start with West Virginia's Mechanicville, N. Y., plant in 1951 after earning an A.B. degree from Amherst and a Master's in business administration from

EXTRAORDINARY NEW LAWSON FLAME-TIP HOLLOW DRILLS DEFY DESCRIPTION

That's a big statement. But leading companies that tested the new Lawson Flame-Tip Hollow Drills experienced such outstanding increases in drill life that we hesitate to quote their findings. Each used the Flame-Tip drills in normal production . . . side by side with ordinary hollow drills of top manufacture. Close track was kept of how often they required sharpening.

New York's Boorum & Pease Company reported, "15 hours between sharpenings as against every four for our regular drills."

The American Pad & Paper Co., of Holyoke, claims Flame-Tip drills last from two to six times longer between sharpenings than ordinary drills, depending on the type of stock.

And Birmingham Paper Company of Alabama went all out with, "...according to our preliminary tests you can increase drill life from 10 to 20 times!"

Almost all the comments were just as glowing. See why we hesitated to quote?

The secret of the Lawson Flame-Tip Hollow Drills is a radically new edge that requires special processing. It's called *Flame Plating* and is available on paper drills from Lawson only. Developed by the Linde Company division of Union Carbide Corporation, it is an exclusive technique for applying thin coatings of tungsten carbide to the drill tip.

Not only does Flame Plating increase the hardness of the drill to make it last hours longer between sharpenings, but it enhances the finish. This reduces the "puckering" often caused by normal drills, lets the Lawson Flame-Tip spin smoothly through the most difficult stock with exceptional ease.

As you might expect, the extra processing involved in producing these extraordinary drills does make the Flame-Tip more expensive than the drills you are now using. But . . . the extra usable drill life and reduced machine downtime will many times outweigh their extra cost.

Lawson Flame-Tip Drills must be used to be believed. Try them on your next job and see if you don't agree. There's a full range of sizes priced at $11.50 each. They are packed six to a box, fully guaranteed by The Lawson Company, Division of Miehle-Goss-Dexter, Inc., world's largest manufacturer of graphic arts machinery. Regular Lawson drills still sell for just $6.00 each.

Select your drill sizes from the chart below and remember to specify *Flame-Tip*. Be sure to state the make of drilling machine you use. Order from your nearest MGD sales office, or direct from:

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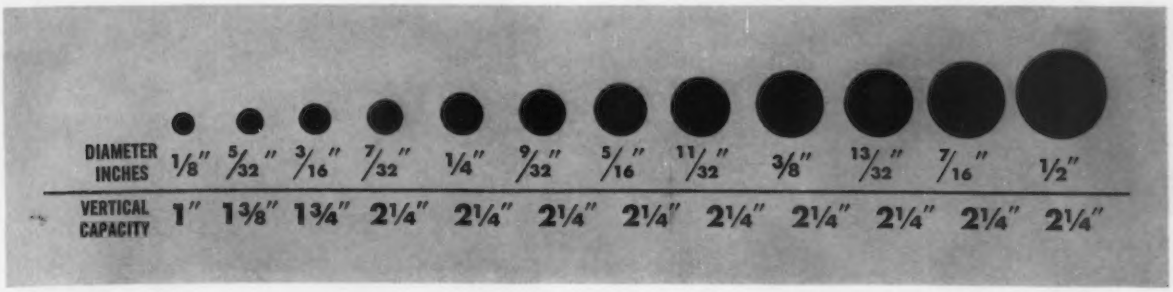
Chicago 8, Illinois



Harvard Business School. He joined the management of the Kraft Division at North Charleston in July of 1955 as personnel manager.

Watervliet Plant Gets New Manager

Valentine Friedrich, Jr., has been appointed division manager of Watervliet Paper Co., Grand Rapids, Mich.

The appointment was made by Hammermill Paper Co. of Erie, Pa., of which the Watervliet company is a subsidiary.

Mr. Friedrich, who was vice president in charge of manufacturing at Beckett Paper Co. of Hamilton, Ohio, which also is a subsidiary of Hammermill, has been with the firm 37 years.

Brown Elected to Hercules Board

Arthur F. Brown, of Glens Falls, N. Y., has been elected a member of the board of directors of Hercules Powder Co. Mr. Brown, who has been president of Imperial Color Chemical & Paper Corp. since 1953, will be general manager of Hercules' eighth operating department, to be known as the Imperial Color Chemical & Paper Department. He joined Imperial in 1921 as a technical salesman, and in 1923 was named general manager of the Pigment Color Division. He was appointed a director of the company in 1928, and executive vice president in 1952.

We are preparing a list of persons who are serving the pulp and paper industry as consultants. If you are in this category, will you send us a note with your name and address and the field in which you specialize or are particularly qualified? We are anxious that our list be as complete as possible.

Officers Elected by Pulp Chemicals Ass'n.

Pulp Chemicals Ass'n. and the two divisions elected officers for the coming year at the annual meeting April 5 at the Savoy-Hilton Hotel in New York City. The following were elected:

Pulp Chemicals Association: A. B. Doran, president; C. W. Eurenius, vice president.

Tall Oil Products Division: Andrew M. Rankin, chairman; J. H. Ruskin, vice chairman.

Sulphate Turpentine Division: G. W. Gilleland, chairman; F. J. Eveline, vice chairman.

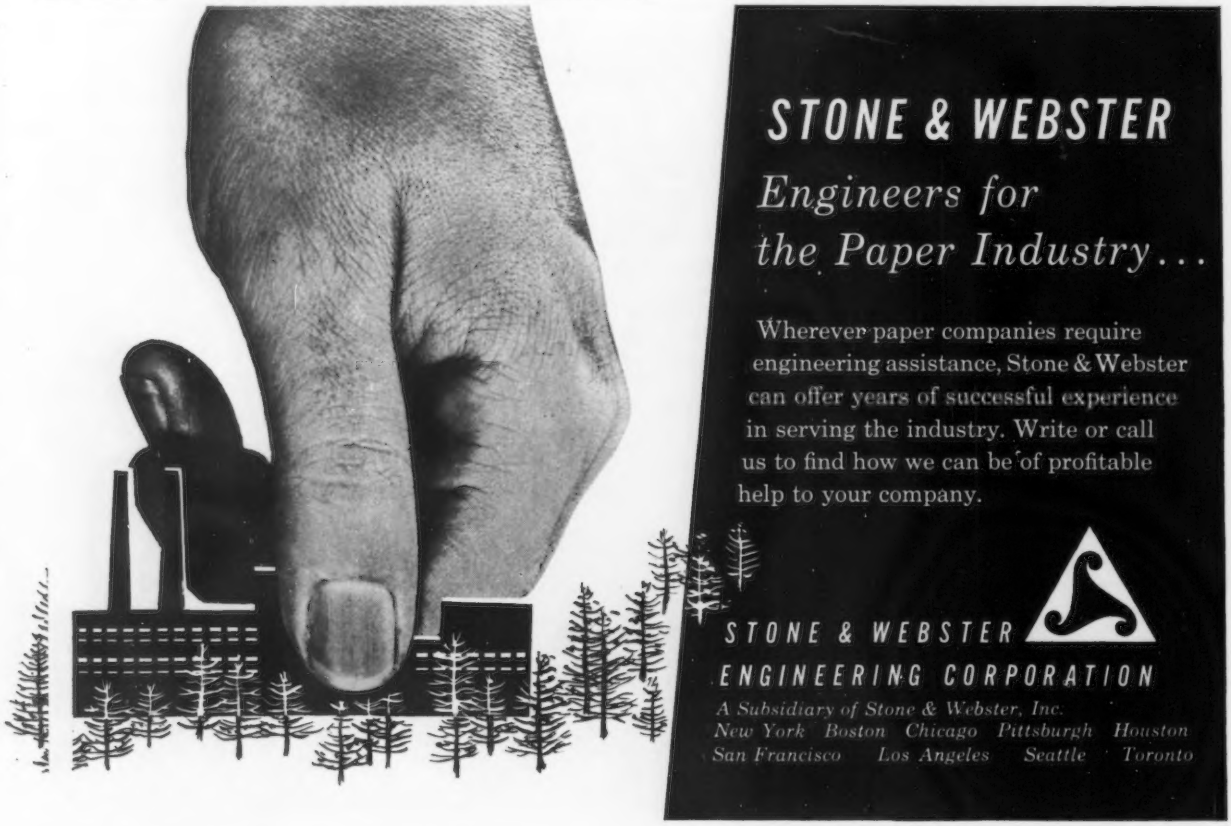
A. B. Doran, elected president, is general manager, Chemical Products Division, Union Bag-Camp Paper Corp., and has served as chairman of the Tall Oil Products Division for three years previous. He succeeds R. J. Spitz, vice president of Heyden-Newport Chemical Corp., who has been president for two years.

C. W. Eurenius, elected vice president, is assistant general manager of the Paper Makers Chemical Department at Hercules Powder Co., Inc., and has been vice chairman of the Tall Oil Products Division.

Andrew M. Rankin, elected chairman of the Tall Oil Products Division, is sales manager, by-products, of the Continental Can Co., Inc.

Elected vice chairman is J. H. Ruskin, president of Arizona Chemical Co.

G. W. Gilleland, technical assistant to the executive vice president at St. Regis Paper Co., continues for a second term as chairman of the Sulphate Turpentine Division as does F. J. Eveline, vice chairman of the division, administrative assistant at West Virginia Pulp & Paper Co.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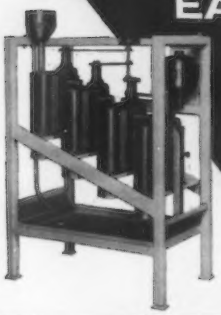

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PJT NEWS OF CONVERTERS

Miller Container Corp. Announces Expansion

A half million dollar expansion program in 1960 was announced recently by a Rock Island industry on the occasion of its first anniversary.

The industry is the Miller Container Corp., which manufactures corrugated containers at its plant on the Andalusia Road about three miles west of Highway 67.

Included in the proposed expansion are the erection of a 100- by 320-foot building estimated to cost $160,000 and installation of additional equipment costing approximately $310,000. The new structure will add 32,500 square feet of floor space. The total plant, including office area, will then have 65,000 square feet of floor space. The firm also expects to double its present personnel of 45 when it occupies the new building.

Ludlow Papers Advances Executives

In a move further to strengthen and expand its research and development activities, Ludlow Papers, Needham Heights, Mass., has made appointments to both existing and newly created technological positions.

Austin W. Fisher, Jr., Ludlow's present research director, will assume the position of vice president, technology. Dr. Fisher will be in charge of the over-all technical program including research, quality control technical service and engineering development for all paper and plastic products.

Succeeding Dr. Fisher as director of research is Howard H. Reynolds, who comes to Ludlow from the Cryovac Division of W. R. Grace & Co., Cambridge, where he was manager of the technical department.

Robert M. Yahres has joined Ludlow Papers as director of quality control. Mr. Yahres will have staff responsibility for the maintenance of quality standards for all fine paper, coarse paper and plastic products.

Walter F. Biggins, who has been manager of quality control will assume the newly created position of manager of technical service, where he will coordinate technical assistance to sales and manufacturing.

J. M. K. Davis

TCMA Announces Associate Membership Plan

To increase technical cooperation between tabulating card manufacturers and their suppliers, the Tabulating Card Manufacturers Ass'n. has inaugurated an Associate Membership plan.

Associate Memberships will be made available to manufacturers of tab card machinery, instrument makers and suppliers, and manufacturers of stock, ink, cartons and other tab card components. The purpose of Associate Membership will be to maintain close liaison with tabulating card manufacturers insofar as technical problems are concerned and to determine the needs of the industry in the field of product development.

J. M. K. Davis, president of Connecticut Printers, Inc., was elected president of the TCMA for 1960. Elected vice president was M. G. Lewis, Lewis Business Forms, Inc. Elected to the Executive Committee were: W. R. Schween, Ennis Business Forms, Inc. (Tabulating Card Division); Edgar Snider, Electronic Accounting Card Corp.; John A. Taylor, The Morley Co.; John E. Cleary, Mid Continent Tab Card Co.; and W. F. Tiernan, Jr., Williams and Marcus Co.

Keep your eye on our Classified Advertising Section

Mead Packaging Advances Garner

C. Greene Garner recently was promoted from treasurer to general manager of Mead Packaging's Atlanta plant, a division of the Mead Corp.

Arthur L. Harris, vice president of the Mead Corp. and general manager of all Mead Packaging plants in Los Angeles, Lawrence, Mass., and Atlanta, said Mr. Garner will assume full responsibility for operation of the Atlanta plant.

Mr. Garner joined Mead Packaging, formerly the Atlanta Paper Co. in 1939. He was elected comptroller in 1953 and treasurer in 1955.

New Paper Supply Firm Formed

Martin Krauss, formerly of Carlton Paper Corp., and Julius Harris, formerly of Empire Brushes, Inc., have announced the formation of the Princeton Paper Co., 43 Jay Street, New York, N. Y. The company will supply paper and twine, packaging, shipping and cutting room supplies.

Weston Paper to Construct Corr. Container Plant

Officials of the Weston Paper and Manufacturing Co., Dayton, Ohio, disclosed plans for the construction of a new corrugated shipping container plant in Fort Wayne, Ind.

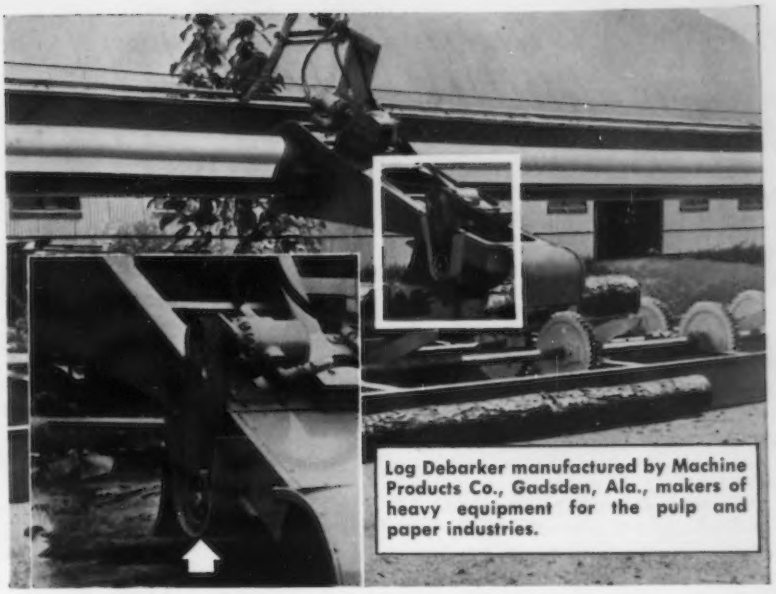
The plant would ultimately consist of up to 130,000 square feet of space and employ 150 people.

According to Ward S. Hubbard, chairman of the board of the paper firm, negotiations for the purchase of a 10-acre site adjacent to Baer field municipal airport in Fort Wayne have been under way for several weeks. Purchase arrangements for the city-owned property must be approved by the city council.

Charles H. Hutchins, senior vice president and director of marketing for the paper firm, said when the city council gives them the go ahead, construction would begin within 30 days and initial production would start by October 1.

In another announcement Mr. Hutchins said Robert F. Reyher, sales manager of the firm's Chicago plant, has been appointed general sales manager of the Wabash division, with headquarters in Terre Haute, Ind.

Bernard J. McMahon, assistant sales manager at Chicago, was named to succeed Mr. Reyher in the Chicago job.



Log Debarker manufactured by Machine Products Co., Gadsden, Ala., makers of heavy equipment for the pulp and paper industries.

This V-Belt Drive costs less,

takes shock loads chain couldn't handle!

Another manufacturing problem solved by the high capacity of Gates Super HC V-Belt Drives...

The makers of the Log Debarker shown above found that the chain drive on the debarker head could not always handle the shock loads characteristic of this operation.

To insure buyers of this machine top performance and freedom from down time, Machine Products Co. replaced the chain drive with Gates Super HC Drive.

Not only have they eliminated down time and replacement costs from shock-load breakage of the chain, the makers have also actually cut manufacturing costs because the Super HC Drive permits a smaller debarker head.

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To gain 6-8 points in groundwood brightnesses at Bucksport, Me. . . .

St. Regis Adds Zinc-Hydro Stage To Peroxide Bleach Plant

Harry Dyer,
Assistant Editor

To improve the flexibility of its groundwood bleaching plant, the Bucksport, Me., mill of the St. Regis Paper Co. has tacked on a second-stage zinc hydrosulphite system to its original one-stage peroxide bleaching facility. The new system now permits the Bucksport mill to make printing grades of paper in the higher brightness ranges with a less expensive combination of chemicals.

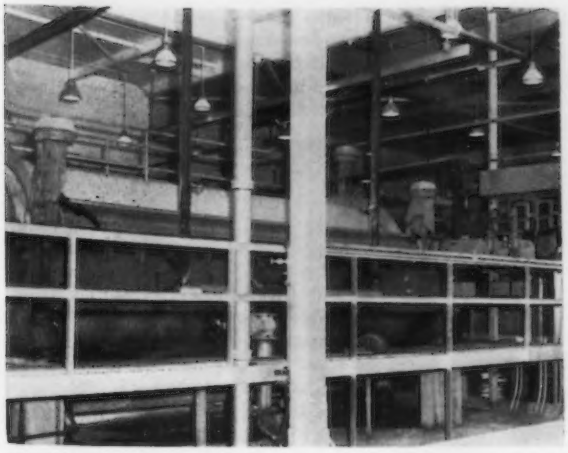
Although the zinc hydrosulphite bleaching system has been used effectively for several years, this is the first installation to utilize a medium density upflow tower as a second stage. The reason for designing an upflow system is to prevent air from getting to the pulp after the addition of the zinc hydrosulphite. This purportedly provides at least an additional hour of air-free retention time for the bleaching to occur. A zinc hydrosulphite solution will decompose rapidly in the presence of air; thus, an air-free system permits all of the chemical's bleaching potential to be utilized by the pulp. This sequence of bleaching groundwood pulp first with peroxide (an oxidizing agent) followed by a "zinc-hydro" (a reducing agent) treatment was proven effective in St. Regis labs and in two mill trials last year.

In the words of Carl Perkins, assistant pulp superintendent, it was "at 10:00 p.m. on February 23 the first groundwood pulp came to the top of the new zinc-hydro bleach tower. The following day the first two-stage bleached groundwood was supplied to No. 2 paper machine. Although it has been found that a few changes will need to be made, the start up in general has been a good one with only the normal amount of problems to be expected in a system this involved."

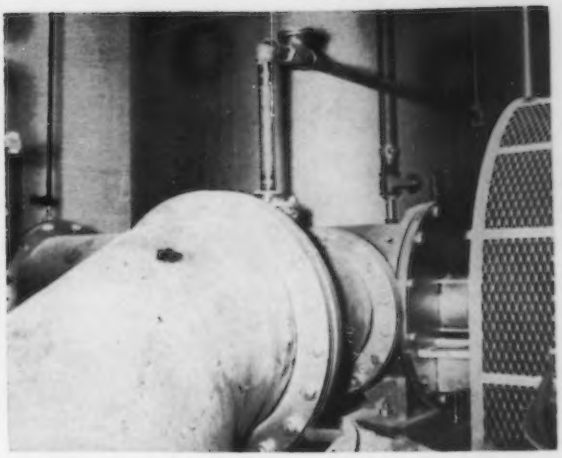
"The variables which affect the brightness gain in each stage are per cent bleach added, temperature, consistency and retention time." Each of these, adds Mr. Perkins, "must be controlled within close limits to get the maximum brightness at minimum cost. At present, with the addition of the new system, we are obtaining a brightness of 76 per cent with the expectation of bringing this up to 78 per cent." The per cent of brightness attained under the old single stage bleaching ranged from 70 to 72 per cent.

◄ **Bucksport's Bleach Plant. The second-stage equipment is contained in the ell-shaped addition seen at the left rear in the photo.**

William R. Adams, president of St. Regis Paper Co. inspects the groundwood bleach plant facilities with Mr. Goodwill (c.), resident manager at Bucksport, and Mr. Clark (l), manufacturing superintendent at the mill.



The deckers, one of which is shown above, are located on the top floor of the bleachery.



Stock piping leading into the single-shaft zinc hydrosulphite mixer at the base of the second-stage tower.

First Stage Peroxide

Unbleached groundwood is pumped from the groundwood decker chest to a Trimbey proportioning meter that regulates tons of pulp to the bleach plant between 35-170 B.D. tons per day at 2.78 per cent consistency. Two Link-Belt 4:1 P.I.V. units powered by a 5 h.p. motor drive the meter's roll.

At the Trimbey are added a 5 per cent solution of sodium tripolyphosphate (STPP) at a rate of ½ per cent per ton of pulp, and a calcium chloride solution at a rate of 1 per cent per ton, both for the purpose of sequestering undesirable ions.

From the Trimbey, the stock drops through a 14-inch line to a Warren 3500 g.p.m. fan pump driven by a Louis-Allis 125 h.p. motor, is diluted to 1½ per cent consistency and is pumped to two 8-foot by 16-foot Impco valveless deckers on the top floor of the bleachery. Here, stock is thickened to 12 per cent consistency.

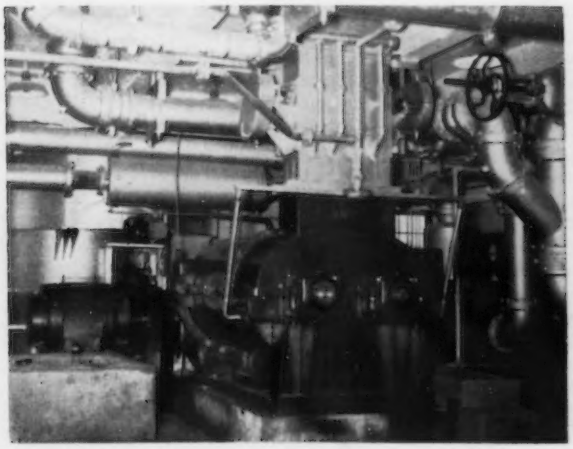
Each decker drum is equipped with a 40-mesh stainless steel wire forming roll, vaned take-off roll and travelling shower. Speed of the drums is determined by the level of stock in the vats, and speed changes are automatically transmitted to GE 10 h.p. 2400 r.p.m. 240 V shunt-wound drives through vat level indicators in series with pneumatic rheostats.

Filtrate from the decker is collected in a 36-inch diameter by 72-inch high stainless steel tank. Here air is separated from the filtrate by a 1550 c.f.m. capacity Nash vacuum pump and exhausted into the atmosphere through a Maxim muffler. The deaerated white water then flows by gravity into a open-top seal box. Up to 1362 g.p.m. of this white water passes through a magnetic flowmeter and is used for dilution of the stock at the fan pump. Another 1000 g.p.m. is used for making up SO_2 peroxide-neutralizing solution (which is described later). Surplus white water from the seal box overflows into a seal pit. Seal pit water is used for groundwood manufacture.

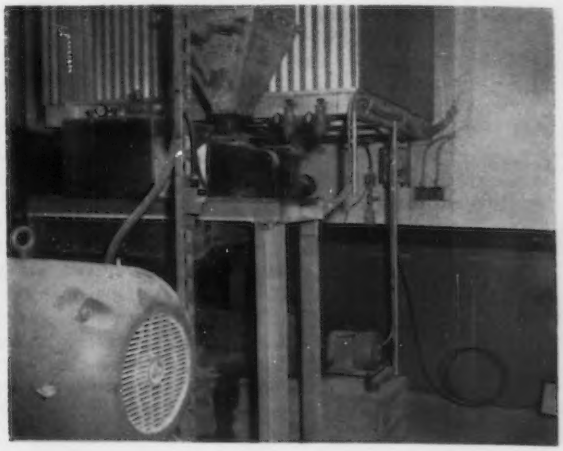
From the deckers, the thickened pulp drops onto a repulping screw conveyor, which moves the stock laterally into a drop line feeding a home-made double-shaft mixer, chain-driven by a 7½ h.p. motor. Steam is added at this mixer to raise the temperature of the pulp from nearly 90°F. to 95-100°F.

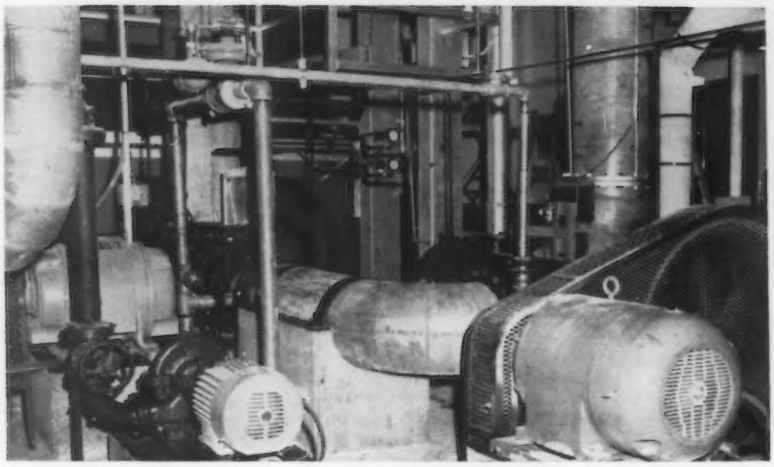
The stock next drops into an Impco double-shaft mixer driven by a Louis Allis 75 h.p., 1180 r.p.m. motor.

Steam is added to the pulp at the upper home-made double shaft mixer; peroxide liquor is metered in at the lower double shaft mixer.



Zinc-hydro powder is fed from the hopper onto the continuous scales, then dissolved, with the solution metered to the mixer by the pump shown in the background.





Bleach plant basement, where stock from first stage tower drops down chute into thick stock pump, through 24-inch line to SO_2 and steam mixer, up through line to zinc-hydro mixer.

It is here that a 1-2½ per cent peroxide bleach solution is mixed with the pulp, being metered in through a Fischer & Porter rotameter from a 900 gallon capacity storage tank.

Actual first-stage bleaching occurs in a reinforced-tile downflow tower, 14 feet in diameter by 43½ feet in height. Retention time in the tower is determined by regulating the Trimboy's feed rate, and by controlling the rate of discharge screws at the base of the tower. Minimum retention time is two hours. An Impco scraper arm driven by a 15 h.p. motor discharges the pulp from the bottom of the tower into the discharge screw conveyor.

Second Stage Zinc-Hydro

Under the new system, the pulp is discharged from the first tower with horizontal 10-inch diameter by 10-inch lead screws driven by a 25 h.p. d.c. motor into a chute to Impco high density pumps. Previously the pulp was diluted at the base of this tower but to save steam and space in the second stage, there is now no dilution between stages. The pulp is fed at a rate of 258 g.p.m. and is at a temperature of 90°F. In the 24-inch stainless steel stock line from the thick stock pump to the tower, there are two single shaft mixers.

At the first of these are added sulphur dioxide, to neutralize the first stage chemicals, and steam, to raise the temperature of the pulp to 120°F.-140°F. This mixer is driven by a 60 h.p., 2300 volt GE induction motor. The SO_2 in the form of sulphurous acid, is added at the rate of 10 g.p.m. by a booster pump. Steam, 164 p.s.i.a. 400°F. is added at 7000 lbs. per hour.

Zinc hydrosulphite solution is introduced at the second mixer; at a weight of ½ to 1 per cent on the pulp, equivalent to a rate of 1.1 to 5.6 g.p.m. Flowing at 288 g.p.m., the stock then enters the bottom of the second-stage tower at a consistency of 10-11 per cent.

This steel, tile-lined upflow tower measures nine feet inside diameter by 53 feet high and is designed to process 168 tons of b.d. tons of pulp per day, considering a 60 minute retention in a 2400 cubic foot volume. At the top of tower the pulp is scraped into a discharge chute by a revolving three-paddle sweep. The scraper's drive is a GE induction motor, of 20 h.p. 875 r.p.m. rating. Through the 14-inch diameter chute, the stock drops into a mixing tank where it is diluted with excess paper machine white water to 3.5-4 per cent consistency.

The pump which circulates the diluted stock through an 8-inch stain-

Electrical Engineering of Bleach Plant

Lloyd W. Burr,
Asst. Electrical Supt.

The electrical engineering and the design of the electrical system of the new zinc-hydrosulphite bleach plant presented more than the usual number of problems generally encountered on a job of this size.

Early in the design, a study showed the feasibility of replacing the existing 440-volt control center with a complete new control center. The new control center would incorporate control for both the first stage and second stage plants in a unit of less size than the original first stage control center. This meant a saving of space, more room in the new building for the process equipment, and possible future expansion. This phase of the project was complicated by the necessity of maintaining operation of the existing peroxide bleach plant. The job was done by disconnecting, moving, and re-connecting the entire old load center in a temporary location. This was done during one of the scheduled shutdowns which were arranged for other phases of the construction. The new load center was then installed in its permanent location and connected unit by unit whenever a little shutdown time was available.

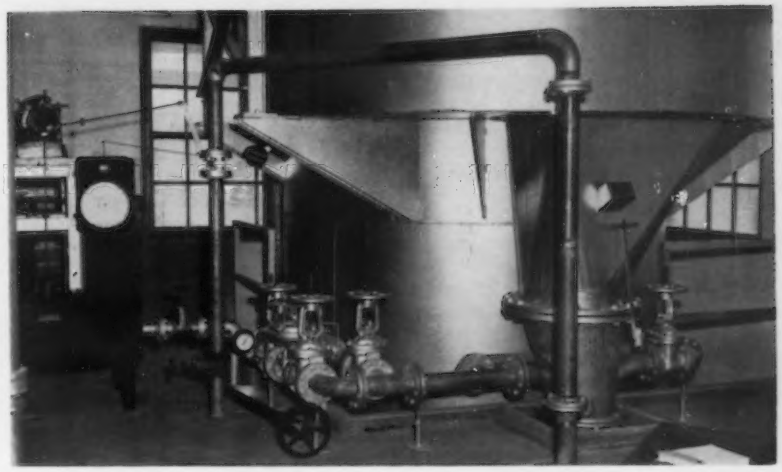
The new load center provides the most modern type of motor control. In addition, it is properly divided to separate controls of the peroxide plant from those of the zinc hydrosulphite for purposes of best operation, maintenance and handling of electrical power charges.

For accounting purposes, it was also necessary to divide the 2300-volt switchgear to electrically separate the two bleach plants. This was done and metering installed during one of the scheduled shutdowns.

Two new 2300-volt motor controllers were installed. One of these is a new type just announced by one of the manufacturers of electrical equipment. This controller is unique because it is a completely redesigned job based on suggestions and requests made by the electrical engineering staff of St. Regis' Bucksport plant and of electrical engineering staffs of other Maine paper mills.

Many of the electrical and instrument units of both the peroxide bleach plant and the zinc hydrosulphite bleach plant are connected into two separate sequence controls. These sequence controls are interlocking electrical systems which require that the motors concerned must be started and stopped in a certain order. This system was designed by the electrical engineering staff to requirements specified by the bleach plant operating department.

Stock is discharged from the top of the second-stage upflow tower by a scraper. Also shown is the consistency regulator that dilutes the stock from 11 to 4 per cent with paper machine white water at the mixing tank.



less steel stock line to the storage chest supplying the paper machines is a Warren 900 g.p.m., pump driven by a 60 h.p. motor at 1150 r.p.m. The tile chest is split by a midfeather; capacity of each section is 4 tons of pulp at 4 per cent consistency. Each section is equipped with 48-inch 4-bladed agitator driven by a 25 h.p. motor. Another Warren pump, this one with a 1200 g.p.m. capacity driven by a 75 h.p. motor at 1200 r.p.m. sends stock through a 10-inch line from the chest through a 10-inch Fischer & Porter consistency regulator on the route to the paper machines. White water dilutes the stock to 3 per cent consistency at the pump.

Chemical Makeup Separate

With the exception of zinc hydrosulphite bleach makeup, preparation of chemical solutions is accomplished in a building separate from the main plant. These include the sodium tripolyphosphate, calcium chloride, and peroxide solutions.

Peroxide Bleach Liquor. St. Regis mixes both hydrogen peroxide and sodium peroxide to obtain the desired alkalinity of bleach solution, thereby eliminating the use of both sulphuric acid and caustic soda. Silicate of soda is included in the bleach solution to act as a buffer and to maintain pH of the bleach solution in the desired range of 10 to 10.5. Epsom salts are also an ingredient which act as a stabilizer of the alkaline peroxide solutions.

Fifty per cent hydrogen peroxide solution arrives at the Bucksport mill in 40,000-lb. tank cars and is pumped to two outside 5000 gallon aluminum storage tanks. From here, a 60 gallon aluminum measuring tank delivers H_2O_2 into a vertical 4500 gallon stainless steel mixing tank provided with agitation. Concurrently an overhead crane empties 400-lb. capacity steel drums of sodium peroxide into the mixing tank. Epsom salts are dumped in manually from 100-lb. bags. Silicate of soda, in liquid form, is metered into the mixing tank from a 235-gallon measuring tank.

The silicate of soda does not arrive at the mill in liquid form but in bulk as silica glass in railroad cars. It is stored in a 150,000-lb. capacity wooden bin. A 2-ton trolley bucket delivers the glass from the bin to the top of a 5-foot diameter by 12-foot high dissolver. Here the glass is dissolved and cooked to 40°Bé by direct steaming at a pressure of 80 p.s.i. At the end of the cook, the charge is relieved into a 10 foot diameter by 18 foot high blow tank. Solids are next settled out of the liquid silicate in a 10-foot diameter by 20 foot-long tank. There are two vertical steel storage tanks capable

Includes New Static Motor Control

Another Bucksport "first," and an outstanding feature of the project was the replacement of the three d.c. drives in the groundwood bleach plant with three GE Amplistat Speed Variator adjustable speed drives. The Amplistat is a packaged static all-electric drive operating from alternating current power.

We have had various units previous to this time which converted a.c. power to d.c. power, for variable speed drives by using motor generator sets to accomplish this. These motor generator sets require constant attention for lubrication of bearings and replacement of brushes. Also, at intervals, the generator commutators have to be re-surfaced, which is a major job.

The new Amplistats are completely static. This means no moving parts in the unit employed for the a.c. to d.c. conversion. This conversion is accomplished by the use of rectifiers, condensors, and resistors. The use of this type of equipment means also there are no electronic tubes to be periodically replaced.

It is expected that the use of this equipment is a step forward toward reducing maintenance costs. These units give the plant operators a wider speed range for process control which is especially helpful at the lower speeds.

These three units are the first of their kind in St. Regis mills and to the best of our knowledge are the first manufactured by General Electric Co. for production in the eastern U. S.

An important feature of the new plant is the concentration of controls, both electrical and instrumentation, on the instrument panel on the bleach plant's operating floor. Efficiency of operation is thus improved by allowing the operator to control a major portion of equipment from a single location. To obtain the present complete instrument panel, it was necessary to relocate the sulphite bleach plant instrument panels which contained electrical, process, and instrumentation controls for the sulphite plant.

All of the wiring of the new plant and changes in the groundwood bleach plant were done in interlocked armor PVC jacketed cable on aluminum cable racks. This type of construction has been in use at Bucksport since 1954 with excellent results.

Electrical engineering and construction of the bleach plant project was directed by **N. L. Danforth,** electrical and instrument department superintendent. He was assisted in both engineering and construction by **Lloyd W. Burr,** assistant electrical superintendent and **Lorado C. Carter,** electrical engineer. All electrical construction and installation work was done by our own electrical and instrument crews.

of holding 162,000 lbs. of liquid silicate. The silicate measuring tank follows these storage tanks.

The following chemical consumption figures are reported to be typical: Na_2O_2, 22 lbs. per ton bleached pulp; H_2O_2, 13 lbs. per ton; silicate, 33 lbs. per ton; and Epsom salts, 1 lb. per ton.

When mixing is completed, bleach liquor is pumped into a 6400 gallon tile-lined storage tank located in the raw materials building. Following this there is an intermediate storage tank in the bleach plant that stores 700 gallons of liquor.

Sulphur Dioxide arrives in liquid form in 40,000 lb. capacity tank cars. Sixty to 100 p.s.i. air pressure, provided by an Ingersoll-Rand compressor, is used to unload the SO_2 into two stainless steel 40,000 lb. capacity vertical storage tanks located inside the building. The same pressure system transfers the SO_2 to the bleach plant, where a steam evaporator, rotameter, pressure reducing valves, and diffuser convert the liquid into a gas which is then dissolved in fresh water and decker white water to form sulphurous acid. pH of the SO_2 neutralizer solution is maintained between 5.5-6.5.

Calcium chloride and sodium tripolyphosphate both are received in 100-lb. bags and are dissolved separately by water in their own agitated tanks. The STPP is made up in 5 per cent solutions; consumption being about 10 lbs. per ton of pulp. For the $CaCl_2$, 1600 lbs. are dissolved in 500 gallons of water, which is added to the stock at the rate of 5-lbs. per ton of pulp.

Zinc Hydrosulphite. Since a solution of this chemical will decompose rapidly, it is prepared continuously near the double-shaft mixer previously described. The zinc powder arrives in 100 lb. capacity barrels which are stored on the second floor of the bleach plant. An overhead crane delivers an uncapped container into a barrel rollover. This is a pipe-frame device of St. Regis design which inverts the barrel over a hopper. The hopper has a 10-barrel capacity, and feeds the powder at a controlled rate onto a Thayer continuous scale. From the scale the powder is fed into a dissolving chamber where it is mixed with fresh water to a 5 per cent solution. A Lapp Pulsafeeder metering pump delivers the solution to the mixer at a 1.1 to 5.6 g.p.m. rate. Zinc-hydrosulphite consumption ranges between 10-20 lbs. per ton of pulp.

As a precautionary measure against dust deposition and dust inhalation by the operators, an induced draft fan collects zinc dust rising out of the hopper. Water showers playing on the impellers dissolve the dust; the resulting solution being sewered. The zinc hydrosulphite is reported not to be a hazard, but some operators will occasionally receive a minor skin rash from prolonged contact with the chemical.

Two-Man Operation

Control of the two-stage bleaching can be almost wholly effected from the instrument panel located on the fourth or operating floor of the five-story bleach plant. There are two operators per shift; the bleacherman and his assistant. The bleacherman most generally overseers the automatic controls on the panel; the assistant is largely responsible for those throughout the plant that require manual adjustment.

Instrumentation, supplied by Minneapolis-Honeywell, Mason-Neilan, Foxboro, Fischer & Porter, DeZurik, and Taylor, consists principally of:

Level recorder-controllers for the Trimbey meter, the deckers, the first-stage tower; the second-stage mixing tank, and the bleached stock chest (recorder only);

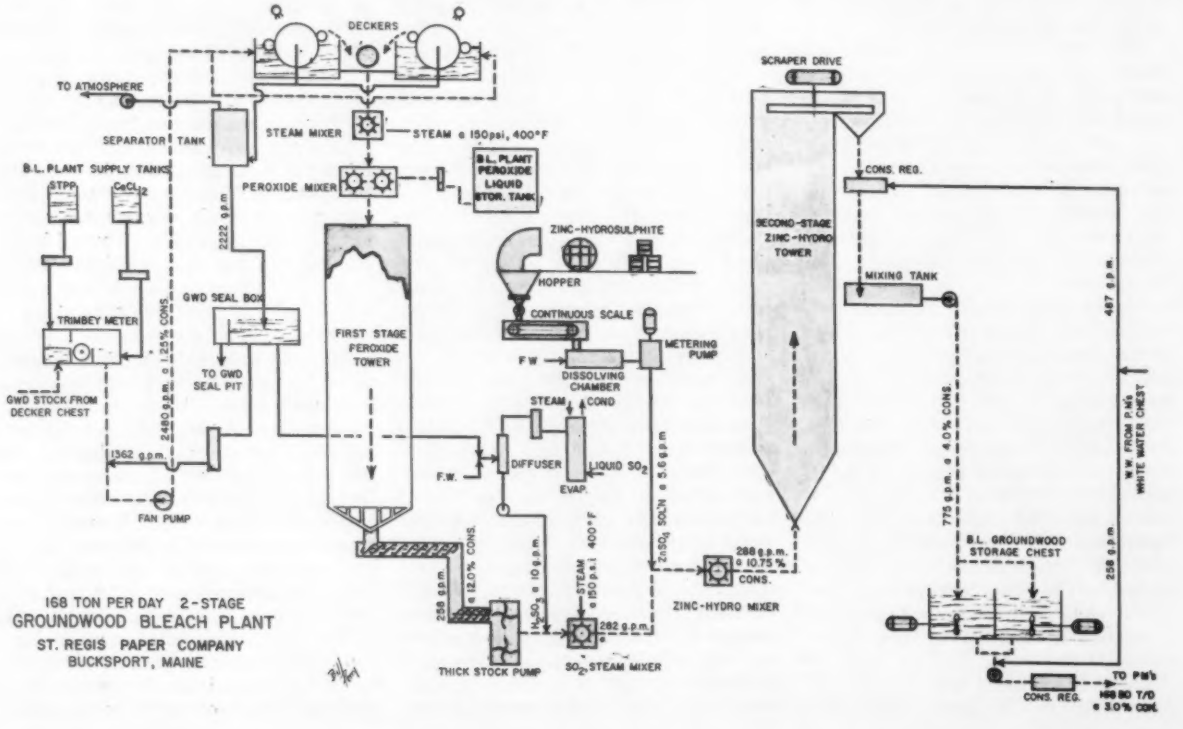
Flow meters for the STPP, $CaCl_2$ peroxide, and SO_2 solutions;

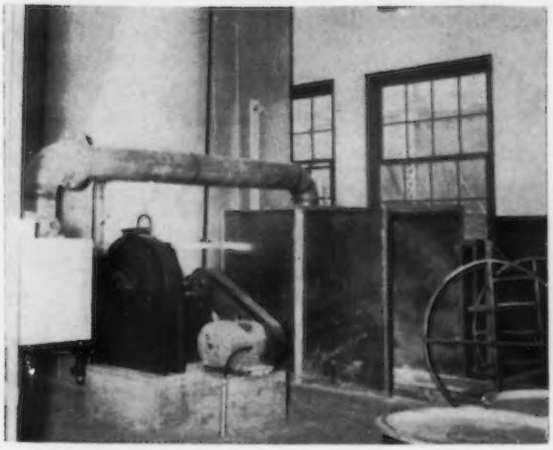
Flow recorder-controllers for stock flow at the first-stage tower zinc hydrosulphite flow to the continuous scale, and white water flow to the stock following the second-stage tower.

Consistency recorder for the bleached storage chest. A repeat recorder-controller is located in the paper machine's panel.

Temperature recorder-controllers at the single-shaft steam and SO_2 mixers.

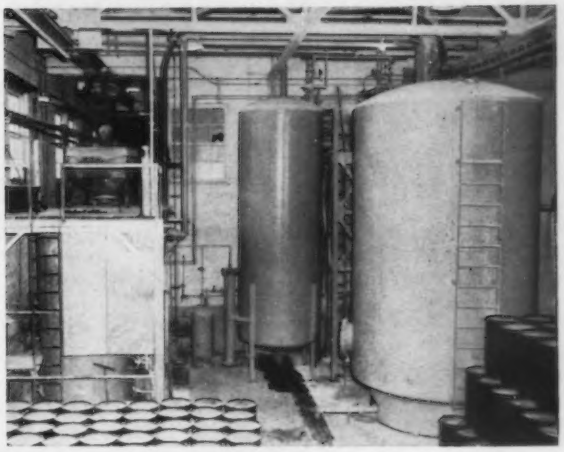
Solenoid valve following the fan pump to prevent stock from backing





A barrel of zinc hydrosulphite powder is clamped into the home-made rollover and inverted over the hopper. Rising dust is collected by fan, watered down, and the solution sewered.

Section of the materials makeup building showing the silicate glass pressure cooker and charging bucket (l.), one of the liquid SO_2 storage tanks, and the silicate blow tank (r.).



up in the line should the pump stop.

pH recorder-controller to regulate the acidity of the SO_2 solution to the mixer. The pH samples are automatically extracted from the stock line following the SO_2 mixer.

The panel also contains most of the motor controls, tachometers, pressure gauges and other controls for the bleach plant equipment.

Bleach liquor preparation area in the materials makeup building, with (l-r) one of the liquid silicate storage tanks, horizontal bleach liquor storage tank, and mixing tank, including silicate and H_2O_2 measuring tanks.

Acquired in 1946

The St. Regis Paper Co. acquired the plant and the properties of the Maine Seaboard Paper Co. in 1946.

The original plant, a newsprint mill, was completed and produced its first paper in November of 1930. The mill continued to produce news grade paper until 1946, when the conversion to groundwood book and magazine papers was started. The plant conversion extended over a period of approximately four years since, in addition to the changes and improvements to the paper machines, it was necessary to construct additional facilities and install considerable new equipment as required for the manufacture of high grade coated and uncoated magazine papers. The major units added were a raw materials preparation building, a peroxide bleach plant, a coating plant, a sulphite flat screen room, a paper machine coater and supercalender stacks. At present the Bucksport mill produces about 320 tons of pulp daily; 200 tons of which are groundwood, the remainder, 120 tons, being sulphite pulp. The bleach plant completed in 1954, has a daily capacity of 280 tons; sulphite pulp is bleached only with peroxide; groundwood is now being bleached with both peroxide and zinc hydrosulphite.

The paper mill has two large machines, each having a 231-inch wire that trims at 213 inches deckle. There is also a smaller paper machine (No. 3) with an 80-inch wire that makes groundwood specialty papers. Catalog and magazine papers are made on No. 1 machine, coated magazine for *Life* on No. 2 machine and miscellaneous specialties and wrapping papers on No. 3 machine. No. 1 machine operates at 1200 to 1300, No. 2 machine at 1400 and No. 3 at 300 to 350 feet per minute. These machines manufacture nearly 346 tons of paper daily.

The zinc hydrosulphite bleach facility is part of a current $1¼ million modernization program. Other projects in the program include: new warehouse addition completed last December, costing $400,000, is 125 feet by 213 feet and provides additional storage for up to 10,000 tons of rolls; improvements made on No. 1 machine, which include a new Beloit reel and winder, and Cameron rewinder, capable of 3000 f.p.m. speeds. These latter improvements permit the mill to increase the maximum diameter of its rolls from 40 inches to 50 inches.

Who's Who for the Bleach Plant

Fred B. Goodwill is the resident manager at the Bucksport mill. Manufacturing superintendent is **C. Wells Clark.** Both the groundwood and sulphite bleach plants are under the general supervision of pulp superintendent **A. P. Gregory** and his assistant **Carl Perkins.** The design and successful startup of the bleach plant were the results of cooperation among the engineering, electrical, mechanical, technical, and operating departments at the Bucksport mill. General construction work was done by local contractors after St. Regis' own design specifications.

Something Can be Done About the Finishing Department—III

Examining the Cost of Each Stage Of the Finishing Operation

First step in improving the efficiency of finishing is to analyze accurately the cost of each unit operation. For comparison the author presents figures for a hypothetical 300 T/D mill.

In order to do something about reducing the relative high overall cost of finishing of paper, it is necessary to break down the total into the amounts contributed by each operation. It will then be possible to assess quickly the important phases of finishing which warrant extra attention. The unit costs given below are restricted to that for direct wages only. Of course, it is well understood that broke loss is the greatest cost, but this subject has been saved for a separate article.

The type and size of fine paper mill, which is being discussed in these articles, is one having a capacity of 300 tons per day of high grade printing papers with a sheet to roll ratio of 70/30 and a 5,000 ton finished stock warehouse containing 4,000 items and a "Loading Make Up Capacity" of 2,000 tons.

Three Types of Finishing

In this typical mill, there are three general categories of finishing, i.e., plain sheet finishing, sheet finishing with special finish or secondary conversion, and shipping roll finishing. The number of processing operations from paper machine reel to railway car or truck required by each of these categories varies from two to nine. It is not possible to produce industry wide average unit costs of each of the operations without years of accummulation of records. However, a price tag will be placed on each with the sole object of specifying yearly expenditures to draw attention to specific areas for improvement. In other words, when the wage cost of warehousing and shipping in this 300-ton mill is described as costing $7 per ton, it is quite evident that an assignment to improve this operation is concerned with a yearly cost of $630,000. One other general comment is added. It is recommended strongly that before anyone passes lightly over any of the unit costs given here as "out of line" in his mill, he should check the accuracy of the unit costs upon which he is basing his action.

Based on Plain Finishing

The costs of converting paper into sheets is, of course, the greatest. Where coated paper and other extremely deluxe grades are produced, the cost of hand sorting and the cull loss is so much higher than for the bulk of high grade printing papers that this must be carefully recorded and reported to the one responsible. Therefore, the costs of sheeting operations described in the following paragraphs will cover only mills converting the latter. It should also be spelled out that the unit costs below are increased whenever the percentage of paper culled after a finishing operation exceeds five per cent. This will be understood when it is considered that unit costs depend entirely upon output regardless of input.

Sheeter Costs $252,000

The first operation in the process is the rotary cutting or sheeting of parent rolls. In this phase, unit costs vary with the mix of order, size, roll size, and basis weight. Also, this cost is seriously affected by the standard of quality produced by the paper making department. If there are frequent stops and starts to service defective paper or frequent single rolls to cut, the efficiency of the modern wide rotary cutter with multiple backstand is reduced to that of a slow speed narrow rotary cutter. The unit cost per ton assigned to this operation is $4. Therefore, the annual cost for 210 tons per day is $252,000.

Fan Sorting $315,000

The second operation is that of pre-sorting and counting to remove paper with paper machine and cutter defects and to check the results of the automatic counters on the rotary cutters. This unit cost is based upon 100 per cent fan sorting but does not include any 100 per cent inspection or hand sorting as carried out on special coated grades. The unit cost of this operation is extremely high in both broke loss and wages. The unit cost of wages assigned to this operation is $5 per ton or $315,000 per year for 210 tons per day.

Trimming Costs $199,500

The third operation is trimming and it should be noted that a great deal of attention has been paid to the automation of this operation. However, in the proper place, it will be questioned whether this operation cannot be eliminated for most end uses or by means of precision sheeters. In spite of the large capital outlays to automate feeding of larger trimmers, the unit cost assigned to this operation is:

Junior Size $3.50 per ton @ 70 tons per day, $73,500 per year.

Parent Size $3.00 per ton @ 140 tons per day, $126,000 per year.

Ream Sealing $199,500

The fourth operation is ream sealing which is being reduced to some extent by packing reams marked in moisture-resistant cartons. There are two unit costs assigned to this; the first for cut or junior size reams which are mechanically sealed and the other for parent size reams which are hand sealed.

Assigned Unit Cost for Junior Size, $3.50 per ton or @ 70 tons per day, $73,500 per year.

Assigned Unit Cost for Parent Size, $3.00 per ton or @ 140 tons per day, $126,000 per year.

Packing Costs $174,450

The fifth operation is packing for which there are three variables and the assigned unit costs are:

1. Hand carton packing, sealing and labelling of parent sizes, $3.00 per ton @ 130 tons per day, $117,000 per year.

2. Mechanical carton sealing and hand labelling of junior sizes, $2.50 per ton @ 63 tons per day, $47,250 per year.

3. Skid packing and labelling of parent sizes, $2.00 per ton @ 17 tons per day, $10,200 per year.

Warehousing and Shipping $449,820

The sixth operation is warehousing of stock, accummulation and loading into railway cars or semi-trailers. The unit cost assigned to this operation for sheets is $7.14 per ton @ 210 tons per day, $449,820 per year.

Secondary Finishing $78,000

The second category of finishing to be dealt with is sheet finishing with secondary finishing operations

"It is recommended strongly that before anyone passes lightly over any of the unit costs given here as "out of line" in his mill, he should check the accuracy of the unit costs upon which he is basing his action."

such as, super calendering, embossing, drilling and/or round cornering, ruling, etc. The unit costs assigned are for the additional costs only of these operations and hence must be added to the other standard sheet unit costs above or the roll finishing costs to follow. Super calendering and embossing costs depend largely upon the skill of the operator and the condition of the equipment. The unit cost assigned is $13.00 per ton @ 20 tons per day, $78,000 per year.

Tertiary Finishing $40,500

Drilling and round cornering unit costs vary 200 per cent with the number of holes required, the continuity of demand, the gang drill equipment and its condition. For the mix of these, the assigned cost is $27 per ton @ five tons per day, $40,500 per year.

Roll Slitting $39,000

The third category is roll finishing and consists of off machine slitting, wrapping, labelling, and weighing, and warehousing and shipping.

Slitting unit costs are divided into counter rolls and converting sizes and depend largely upon the mix of large and small rolls because high speed winder equipment is not used for slitting an average of 20 tons per day.

Counter Rolls Assigned Unit Cost, $8.00 per ton @ 5 tons per day, $12,000 per year.

Converting Sizes Assigned Unit Cost, $6.00 per ton @ 15 tons per day, $27,000 per year.

Roll Wrapping $111,000

Wrapping unit costs also vary with the mix of sizes but the high cost is due to the practice of hand wrapping with a heading machine so common except on the Pacific Coast.

"It will be questioned later in this series whether this operation cannot be eliminated for most end uses or by means of precision sheeters."

The assigned unit costs are:

Counter Rolls, $6.00 per ton @ five tons per day, $9,000 per year.

Converting Rolls, $4.00 per ton @ 85 tons per day, $102,000 per year.

Warehousing and Shipping Rolls $36,220

Shipping and warehousing costs depend upon the percentage of roll production which is warehoused, such as, the counter rolls. Hence, two unit costs are assigned.

Counter Rolls, $7.14 per ton @ 5 tons per day, $10,720 per year.

Converting Rolls, $1.00 per ton @ 85 tons per day, $25,500 per year.

Summary

The total annual cost of finishing in the hypothetical mill based upon 210 tons of sheets and quantities given for each group of sizes and finishes and upon 90 tons of rolls for 300 days per year is $1,894,990 and average finishing cost per ton is $21.05.

Not much can be said about the modernity rating of this hypothetical mill except that it is about the average existing today. The comment was made, however, that mechanical roll wrapping found in some news and kraft paper mills is not present in this mill. All fine paper finishing departments are far from modern in their methods when compared to paper manufacture or printing.

The finishing costs quoted here could be considered as a sample of those for Eastern mills where some attention has been paid to the mechanization of paper handling. The one cost which may be questioned is warehousing and shipping. For instance, this could be half the quoted unit cost if the particular mill ships fiv ton minimum quantities of each item.

These unit costs are not obtained by a nationwide survey but are only one man's idea to demonstrate how much wage money is involved in this area. Thus, the author hopes to interest some of the design engineers or those who direct them enough to have them at least find out for themselves what it is costing in their mill.

It must be pointed out that the total costs quoted here are for direct labor only. The supervisory and planning salaries directly and wholly concerned with these operations will add $100,000 per year exclusive of purchasing, traffic and maintenance costs. Therefore finishing is a business with an annual wage bill of $2,000,000 employing 500 people.

If this is startling, the purpose of this article has been served. However, in the tradition of serial stories, the mill will have to wait and see whether any of the ideas expressed will serve to reduce the weight of this "cross." There are several areas where costs have been reduced 30 per cent when concentrated attention was given to all factors which contribute to the high wage cost.

Putting a Number on Hair Shedding

What is it? Why is it? How does it affect us? How do we solve the problem? How do we measure it?

L. G. Ward,
Senior Research Engineer,
Huyck Felt Co.

There is one problem which all paper makers do not have in common. This is the one which is called "hair shedding." It occurs most frequently on food board, container board, coated papers, book papers, high grade bonds at times, condenser tissue and certain other specialties of like nature.

Since hair shedding exists in such a sizeable minority of our industry, it behooves both papermaker and feltmaker alike to dig into its intricacies and problems. What is it? Why is it? How does it affect us? How do we as papermakers affect it? and lastly, that one big question—How do we solve the problem?

What Is It?

Hair shedding is the transfer of wool or synthetic fibers, from the surface of a papermakers' felt to the surface of the sheet of paper or board.

Why Is It?

Hair shedding exists in two different ways and comes from two different sources. Initial hair shedding, that which we have during the first tour or so of felt operation is a result of manufacturing of the felt. Certain manufacturing processes which are necessary to give a felt its desired finish characteristics are apt to give fairly loose, easily broken hairs or fibers on the surface of the felt itself. These generally are shed within the first few hours of the felt's operation.

The other type of hair shedding is from the wear of a felt. Felts can wear in but one way. This way is by shedding of hairs as a felt is subjected to the abrasion and the stressing in the press section of a paper machine. The yarns will gradually lose their fibers. Let me add at this point that a hair shedding problem does not exist when a felt sheds hairs as such but only when the amount of hair shed passes a certain level which we call, for lack of any better term, a tolerance level.

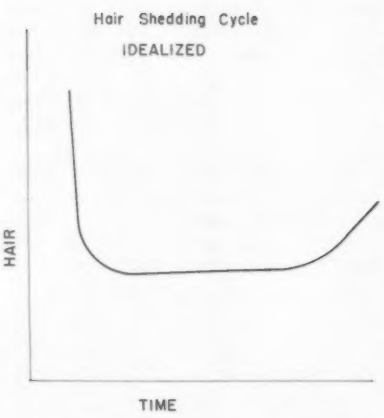


Figure 1. Typical pattern shows that initial hair shedding is high but soon drops off to minimum level, then rises during wear out period.

How Does It Affect Us?

Each hair shedding problem is different. There are however several basic ways in which hair shedding does affect us. First of all, appearance—that little brown hair on the surface of an ice cream carton or a piece of writing paper. Secondly, in printing difficulties—your customers can get in the act with a surplus of felt hairs clogging the printing ink platens. The third one is one of contour problems where hair on the surface of the sheet of paper or board could cause a skip or a streak in coating or perhaps a little ridge under foil lamination.

How Do Papermakers Affect It?

Papermakers can affect hair shedding in several ways. First of all, an extra sticky stock, as you would have with a tub-sized or beater saturated sheet, may tend to pull hairs out of the felt structure. There also may be fairly severe conditions in the presses—crowns that are out of line, newly ground Vickery or Uhle box covers or perhaps a suction shell may be recently reground. All of these can contribute to excess wear and thus, more felt hairs.

How Do We Solve the Problem?

The answer is, we can't. We can, however, improve the situation. We can make it much simpler than it has been in the past.

Our company's development staff was given the job of reducing hair shedding and simplifiying this problem a couple of years ago. To do this job, we first had to investigate the nature of hair shedding and then to develop methods of treatment which would reduce it below the tolerance level.

Figure 1 shows the typical pattern of hair shedding on a one-felt paper machine. The vertical axis represents the amount of hair shedding, the horizontal axis, felt life. On the left-hand side of this curve it can be seen that the hair shedding starts off at a comparatively high level. This we call "initial" hair shedding. It drops quite rapidly to a minimum point at

Presented at Northeastern Division Paper Industry Management Ass'n. Fall Meeting, September 18, 1959.

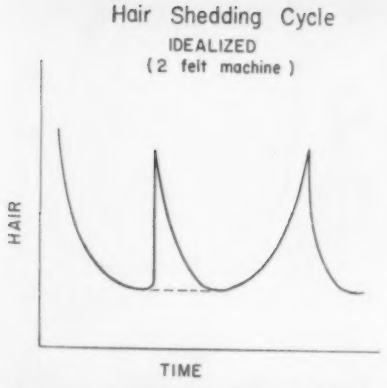


Figure 2. Hair shedding curve for two felt machines with high initial shedding taking place at different times.

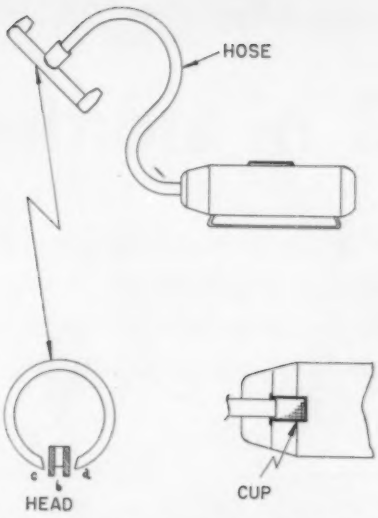


Figure 3. Vacuum scraper is device for collecting samples from running felt. Hairs picked up are caught in the small chamber or cup.

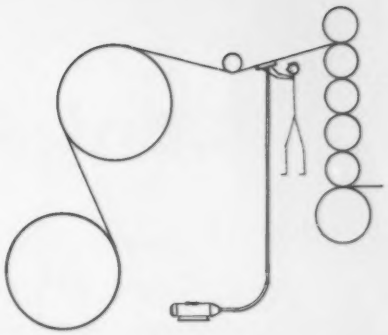


Figure 4. Technique of using vacuum scraper is shown as instrument is applied to under side of sheet. Unit may be attached permanently if desired.

which it continues for a certain length of time. This is the "in-life" hair shedding. After this, it gradually rises in what we shall refer to as the "wear-out" period. The nature of hair shedding in both in-life and wear-out period is the same except that as a felt reaches the end of life, the rate of hair shedding is greatly accelerated.

Figure 2 translates this one-felt curve into the curve for a two-felt machine. Here you see what amounts to two curves as shown in Figure 1, superimposed one on the other but staggered just a little bit in time. The same high initial reading, the same level in-life period, and the same wear-out period appear. The wear out period can sometimes be obscured by the installation of new felts but it still can be observed on certain occasions.

Our development group needed a means of evaluating this problem and in some way putting a number on hair shedding. Obviously, we could not investigate something of this nature very well unless it could be expressed in terms of a numerical scale.

Measuring the Hairs

We considered the use of visual counts whereby the actual hairs appearing on a great number of square feet of paper are counted. This was discarded as there is, first of all, too much paper to look at and secondly, too much of a chance to miss hairs in doing the counting. We decided to try to develop an instrumentation method whereby we could get a count and thus put a number on the property of hair shedding. The instrument which was developed is known as the "Vacuum Scraper." The nature of it is shown in Figure 3. The suction head on the left, is merely a glorified version of the household vacuum cleaner head. The inset at the bottom shows the cross section of this head. Vacuum at point **a** picks loose hairs on the surface. The first scraper and its vacuum **b** pick up those that are somewhat more deeply imbedded. The second scraper picks up even more while vacuum **c** draws them into the chamber. All hairs are gathered in the manifold, passed through the tube and are caught in the small chamber or cup which takes the place of the paper bag which is normally in this type of vacuum cleaner.

Figure 4 shows the technique of using this instrument. To my knowledge, there have never been any breaks on paper machines by using this procedure. The figure shows application of the suction head to the under side of the sheet. If we wish to sample the upper side, this can also be done by holding it over the sheet. In places where one of these units is to be attached permanently to a paper machine, mechanical brackets can be arranged so that pressure may be applied by means of a lever.

When the sample is taken and removed from the chamber, it is put on a black piece of paper and examined under either a magnifying glass or low power microscope. The wool and synthetic fibers are teased away from the cellulose fuzz and counted. Figure 5 is a typical example of hair in pulp as received into the sample cup and prepared for a count. Note the great mass of fibers is simply small pulp fuzz. However, there are two fibers here which do not show the characteristics of pulp —one being the long gently curved fiber which is wool and one the long, relatively straight, fiber which is a

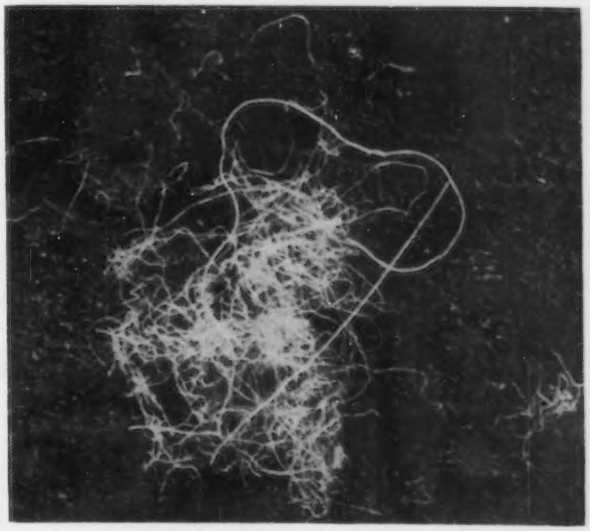


Figure 5. Example of hair in pulp is received in sample cup. Most fibers here are pulp fuzz. Long, curved fiber is wool. Long straight one is synthetic.

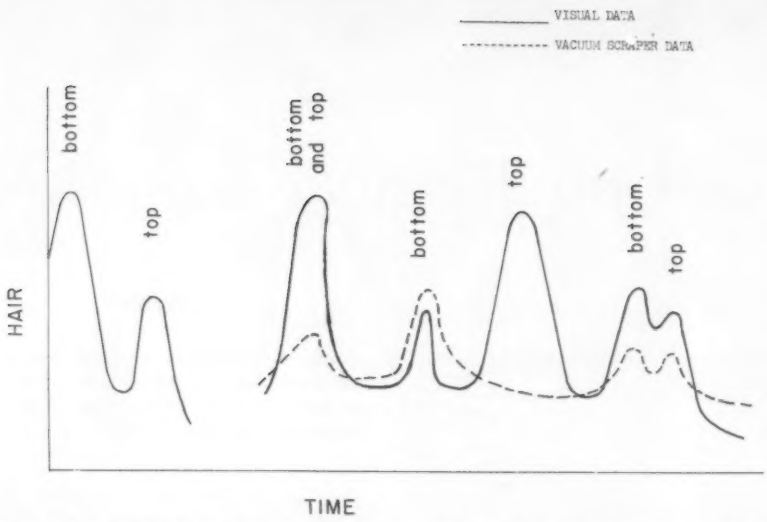


Figure 6. Visual hair count method and vacuum scraper method both show high peak of initial hair shedding as a new felt or pair of felts is installed.

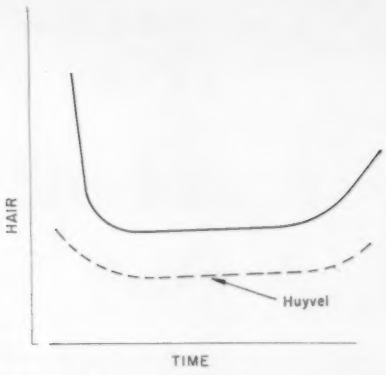


Figure 7. Effect of special treatment on felts is to reduce initial hair shedding by half and in-life shedding by about 20 per cent.

synthetic fiber. This is a quite typical example of what we would expect to see in the hair shedding cup on a machine which used a synthetic content felt. If the machine had been running at 1000 feet a minute, this sample, since we had a 2′ wide sampling head, would have sampled 2000 square feet; consequently, the hair count would have been one-tenth of a hair per hundred square feet.

This device has been used in several paper mills at speeds of 200-1500 feet per minute. The range of grades has gone from book to board. The instrument has not yet been used on light tissues or high speed newsprint, but I see nothing at this time which would prohibit its use on these grades. However, these are not the places where hair shedding is normally a serious problem.

Evaluating the Results

Our first step was to follow the progress of hair shedding in individual mills to prove our theories. Secondly to evaluate the methods of anti hair shedding treatment as applied in our factory. We have been able to accomplish both of these missions successfully.

Some of our more interesting results are shown in Figure 6. Here you will see that both the visual hair count method and the vacuum scraper were used. In every case where a high peak of initial hair shedding shows up, it ties in quite well with the installation of a new felt or, for that matter, a pair of new felts.

In the one case where vacuum scraper data showed no rise and visual count did, this can be accounted for by the fact that the furnish was sticky and retained the hairs. They could not be scraped out by a vacuum scraper. In the two cases where the vacuum scraper data shows quite a rise and visual data does not, a white felt was involved and, after all, if you can't see them, you can't count them.

Through the use of this tool and its number on hair shedding, we have been able to help you as papermakers by developing an approach toward reducing both "initial", "in-life" and "wear-out" hair shedding. This is called the Huyvel Treatment.

Huyvel is not expected completely to eliminate hair shedding, but its effect is rather to reduce hair shedding to a point below the tolerance level. The general effect of Huyvel can be shown in Figure 7. You will note that the "initial" hair shedding is reduced to something about half of the original and the "in-life" hair shedding is reduced by about 20 per cent. The "wear-out" period also shows a similar reduction. One word of caution, this is only a typical example. It all depends on what the original felt was as to what percentage reduction could be obtained by Huyvel treatment. After all, a papermaker may already have a felt that is fairly good from a hair shedding standpoint, so that Huyvel would not have so much to work on.

In summary, through the aid of this new tool, we have been able to put a number on hair shedding. Through the use of this number, we have been able to follow hair shedding throughout the life of a felt and to develop a method of treatment which will aid you as papermakers in reducing both initial and subsequent hair shedding.

Career Opportunities in Pulp and Paper

One of this country's most serious needs, and rapidly growing more serious as modern technology advances, is the need for competent young men. Many industries are going all out in attempting to attract the most desirable technically trained men, and, like it or not, the pulp and paper industry is faced with the prospect of competing for these people or taking what's left.

TAPPI is moving in the right direction with publication of a career guidance brochure designed to provide an attractive view of this field of endeavor. It emphasizes not only the career opportunities offered by our industry, but also the advantages of relative stability, opportunities for advancement, pleasant living and working conditions and personal job satisfaction.

In the brochure several prominent men have expressed highly favorable views on the future of our industry, among them F. A. Seaton, Secretary of the Interior and A. H. Sulzberger, publisher of the New York Times. Also included in the booklet is a section on specific opportunities for technical graduates in pulp and paper. Titled "What You Should Know About Career Opportunities Offered by the Pulp and Paper Industry," the brochure is available at 40c a copy to pulp and paper companies for their own uses.

Manufacturers and Merchants are...

Partners in Distribution

When problems arise, mills and merchants must cooperate in finding a solution. The manufacturers can help the merchants in salesman recruitment and training or other problems such as warehouse operations.

G. Willing Pepper,
Vice President,
Scott Paper Co.,
Chester, Pa.

If we rationalize our business lives, it becomes clear that there is an enormous effort, both in manpower and money, to manufacture the many and varied paper products which make up the paper industry. Manned by the nation's top technical experts, our industry is geared to meet the foreseeable demands of the future. Modern forestry practices, coupled with intelligent use of waste wood and hitherto unused wood species, has insured our wood supply for years to come. New uses for paper are emerging from the industry's research laboratories and the drawing boards give exciting evidence of more to come.

But one major question has yet to be resolved and this critical question hinges on the career each one of us in this room maps out for himself.

Are we prepared to find markets for the high productive capacity which we have today and for the new products of tomorrow? At this moment, I am afraid my answer must be a resounding "NO."

But there is great hope for a better day. This hope springs from a variety of factors and I would like to discuss a few of them. Business men are finally alert to the appalling problem of modern-day marketing. A long war, followed by the easy-come business which we all enjoyed in the post-war years, left us without any strong incentive to sharpen our marketing wits. A mild recession in 1958 caught us unprepared to cope with the problem. Mills and merchants alike were shocked to learn that their

The Author

salesmen had become primarily ordertakers and that there was a vast difference between the two.

There is an opportunity for each of us engaged in the wholesale distribution of paper to put our shoulder to the wheel. And it is in this area, that I wish to explore the opportunities which are open to us.

In order to understand the complexities of wholesale distribution, we must have a sensitive and instinctive appreciation of our mutual purpose. This purpose, in elementary terms, is to move the production of the mills to the cross-roads of America at the lowest practical cost—in volume which will provide the economy of high-speed low-cost operations and yield a reasonable profit to both mill and merchant. The key words in this simple definition can be paraphrased into the title of my talk—"Partners in Distribution."

If we want to take advantage of the inspiration which your Association has given to those of us who earn our living in wholesale paper distribution, we must face up to realization that we must become "Partners in Distribution".

Must Destroy All Animosity

We must destroy once and for all any animosity which may exist between mill and merchant. We must rekindle a spirit of mutual respect and understanding. We must learn to understand each others problems. These are not just sweeping generalities. The merchant must recognize the importance of working in partnership with his mill representatives. Instead of grudgingly allowing his mill representatives to appear at sales meetings, he must court the mill man and encourage him to appear at sales meetings whenever possible.

And, just as in any successful partnership, the mills must recognize that the contribution which they make to the partnership will include products of the highest quality and the greatest value and sales support of the most skillful nature. The standard and oftentimes hackneyed presentation at sales meetings must be sharpened to attract the attention of merchant salesmen and to offer sales aids and training methods which can be applied successfully in the market place.

In order to operate the kind of partnership which I am talking about, both partners must believe in each other. They must be dedicated to a common cause.

• When I say that they must believe in each other, I mean that both merchant and mill must unite to find means for improvement in distribution. They must both explore the in-

Highlights of an address delivered on March 30, 1960, at general session of 57th Annual Convention of The National Paper Trade Ass'n.

tricacies of distribution and be totally satisfied that the system which they have embraced is the most effective means of accomplishing the desired goals.

• When I say that they must be dedicated to a common cause, I mean that they must pledge themselves to a successful unlocking of the barriers and closed doors which have always existed in the historic relationship between merchant and mill.

This further means that when problems arise, manufacturer and merchant should cooperate in finding a solution. If recruitment of salesmen or handling warehouse operations are problems for the merchant, then mill and merchant can find a solution—if the spirit of the relationship is on the basis which I have outlined.

Sales Training

If sales training is a critical merchant problem, then together a solution can be found. At the risk of being criticized for seizing this forum as an opportunity to talk about our own company, I should like to describe briefly how Scott Paper Co. attempted to help in the area of sales training. Our Merchants Advisory Committee has consistently told us that the training of young merchant salesmen presents many frustrations. In an effort to alleviate this problem, we developed a plan last summer to start a sales training program for young merchant salesmen. We wrote to 60 of our merchants throughout the country describing the course which we planned to give. The response from our merchants was most heartening and the twenty places in this first course were quickly filled. Only time will tell if the investment both by the merchants and by our company will be rewarding. I have every confidence that it will be. It is our intention to hold similar courses in the future with a continuing emphasis on young merchant salesmen.

Merchant-Mill Cooperation

The reason that I have injected these comments on sales training is to accent the opportunities, still largely untapped, for merchant-mill cooperation. There is unlimited opportunity for further integration of effort and more extensive coordination between merchant and mill—if we believe in each other—if we are dedicated to a common cause.

Every successful business in America today has been built on these principles. The esprit de corps, the enthusiasm, the teamwork and the hard competitive urge to succeed—so vital in any progressive commercial enterprise—are founded on these principles and the forward progress of any company can be traced by the degree to which the management reflects its faith in them. If men believe in each other and if they are dedicated to a common cause, then no power can stop their forward progress. And so, all that I am asking, and I believe it is our only means of salvation, is for us to join forces as true "Partners in Distribution."

Any successful business enterprise is made up of dedicated men and women who share a common purpose and I believe that merchant and mill must aspire to this lofty idea. In the vital area of distribution, these same principles must prevail. Merchant and mill must be a cohesive, vibrant unit—always reaching for the same objective and true partners in every sense of the word.

Joined together in this fashion, they can succeed together. Divided as so many of us are today, we will continue to flounder, we will continue to berate each other, we will continue to dissipate our energies in needless defensive tactics which can only prolong the agony which so many of us have known over the years. Each of us must give a bit here and there to build a better business for both of us. It means that we understand the enormous stakes which we are playing for and the great opportunities which present themselves to us.

It is not enough to hope that something will turn up. It is our responsibility and it is our house to clean.

"Are we prepared to find markets for the high productive capacity which we have today and for the new products of tomorrow?"

Marketing Institute

There is such an enormous amount to be done in the field of marketing, before we can earn a place in the sun as marketing men; there is so much to be done to dignify the role of the salesman in America today; there is so much to be done to understand better the art of selling so that we can train young men to become more proficient in field selling; there is so much to be done in educating professional buyers and consumers to appreciate the contribution which we make to the economy of the nation; these and many more significant causes must be won—that we must not be handicapped by petty misunderstandings which distract us from the real task which lies ahead.

To give some idea of the task which lies ahead and to show the degree to which men are seeking to find a solution to our marketing problems, Mr. McCabe, the president of our company, has proposed that American industry should join forces to establish a Marketing Institute. He first proposed this striking solution to the complexities of modern-day marketing in a speech last January before the Sales Managers Association of Philadelphia at the celebration of its 50th anniversary. He said, in part that market research tells us much but that it gives us few facts as to why people buy. He said that our progress in the science of marketing has not kept pace with our evolution in the physical sciences.

He proposed that such a marketing Institute should be associated with an outstanding university and should offer a course for graduate students who would be accepted only after completing a broad education in the liberal arts.

Mr. McCabe and others are now dedicated to the establishment of such an Institute and I am confident that it will contribute enormously to the improvement of marketing techniques.

With such emphasis being given to a better understanding of human behavior, it seems clear that we can study profitably the phenomena of merchant, mill behavior. Why do we behave as we do? We certainly don't have to wait for Mr. McCabe's Institute to tell us that we must change the pattern of our behavor. This is clearly written on the pages of his-

"We must destroy any animosity which exists between mill and merchant. We must rekindle a spirit of mutual respect and understanding and learn to understand each other's problems."

tory. We are all familiar with the story of our past. We know, too, if we are honest with ourselves, what we must do to correct our mistakes of the past. The NPTA has awakened to the responsibility which it bears to its membership. The mythical questionnaire which I referred to earlier, would touch a responsive chord among your membership today, because your Association is doing something about your problems. We have a vocal and intelligent trade press which reports our every act and provides us with an editorial forum which illuminates our daily business lives with healthy constructive debate.

Running Battle

Even friendships have blossomed between mill men and merchants. This despite the running battle which seems to go on endlessly between us —battle when it should be eternal peace—battle between merchant and mill man—when the true enemy is inefficient distribution methods.

We can be thankful for many things.

1. An enlightened trade association which gives us an opportunity to meet together twice a year.

2. A vocal and intelligent trade press which accurately reflects our progress while skillfully interpreting our problems.

3. Friendships which somehow survive in spite of the running vendettas which we, merchants and mill men, insist upon perpetuating.

4. A growing dynamic business which continues to develop new uses for paper. A commodity which has universal application in a prosperous, civilized and expanding economy.

We can be thankful for many things! So what is lacking? How did we get off the track? Why are we troubled about wholesale paper distribution?

Resin Reduces Rosin Requirement By Half

Use of a unique sizing aid when added to starch at the size press, enables paper makers to reduce the amount of rosin size requirements by 40 to 50 per cent. The chemical, known as WETstrez P-685, also increases the water resistance and ink penetration of hard sized paper, reports the resin's maker, Reichhold Chemicals, Inc., of White Plains, N. Y. "This should be good news for the paper industry which faces an increasing shortage of wood rosin that will not be solved by the expected increase in production of gum and tall-oil rosins," R. T. Urich, vice president and general sales manager of Reichhold said.

Rosin Supplies Decline

Production of all rosins—gum, wood, tall oil,—was 1.86 million barrels (520 lbs./barrel) in 1959; in 1960 this production is expected to be 1.89 million, but demand is forecasted to reach 1.92 million barrels. In "The Outlook for Tall Oil Production and Consumption" published in PAPER TRADE JOURNAL, Nov. 30, 1959, it was reported that "constant decline in gum rosin production and indications of a similar situation developing in wood rosin may lead to tall oil becoming a large factor as an alternative source of supply of rosin." However, even by 1965, "it is not likely that we will see kraft pine pulp production sufficiently large to permit tall oil rosin to completely replace wood rosin." The U. S. Department of Agriculture foresees wood rosin production in 1965 at about half the current production of 1.18 million barrels. Thus, it appears that the discrepancy between production and consumption will not be balanced, because of declining natural supplies.

The paper industry is expected to use nearly 623,000 barrels of rosin this year. Mr. Urich pointed out that the use of WETstrez P-685 could conceivably cut this consumption by an overall average of 20 per cent. "It is obvious that the rosin saving possibly could help restore the balance between rosin supply and demand," he added.

Urea-Formaldehyde Type

WETstrez P-685 is a modified acid-curing urea-formaldehyde resin. It possesses these characteristics: 48-52 per cent nonvolatile matter; water solubility; 1.20-1.30 specific gravity; 7.4-7.8 pH; white opaque color. When applied at the size press, it improves the dimensional stability and increases the wax pick of the sheet, notes Reichhold. Since it waterproofs the starch, the pickup of starch particles on printing presses is minimized. Higher Mullen and tensile strengths are obtained. Ink penetration time is increased as much as three times those obtained with regular starch sizing.

This improved sizing technique allows the papermaker to decrease the amount of rosin size required at the beater. This results in a more free stock and faster drainage on the wire occurs. The overall result: a better-formed sheet at higher machine speed is possible.

Reichhold suggests the following procedure for size press applications: Cook the starch (whether oxidized, acid modified, or enzyme-converted starch or dextrine) according to the supplier's recommendations. After adding the dilution water, add 5-15 per cent WETstrez P-685 solids based on the dry weight of starch. The starch-resin solution should be adjusted to the same solids as the normal starch tub sizing solution. The pH should be adjusted to 5.0-5.5 using either alum or dilute phosphoric acid.

Pigments can be added to the resin-starch mixture if desired. If clay is used, it should be dispersed using one of the polyphosphates.

If it is not possible to lower the size press pH to 5.0-5.5, increased sizing may still be obtained by using WETstrez P-685 in the manner described above provided the size press is slightly acidic. Heat and time will cure the resin and thereby waterproof the starch.

Mr. Urich pointed out that the resin has been used with excellent results and proven economy. Several mills, who wish to remain unidentified for the present, have substantially reduced their rosin requirements by using P-685, effecting savings in terms of rosin cost averaging $3-4 per ton of paper produced. Cost of WETstrez P-685 averages $1 per ton of paper. The purchase price of WETstrez P-685 is reported to be competitive with present prices of rosin size.

Has Other Uses

Casein-coated raw stock previously treated with starch-WETstrez P-685 will develop faster and better wet rub resistance and higher wax pick.

WETstrez P-685 can be used in starch-clay formulations for both on- and off-machine coating; however, it performs best in off-machine coating applications. Coatings containing the resin have a thixotropic character and may even have a lower viscosity.

MAINTENANCE SERIES
NUMBER 15

Attaining Steady Service From Your Electrostatic Precipitator

This article is offered as a guide to preventive maintenance which will allow you, the kraft mill operator, to obtain the most from your investment.

S. Rabkin,
Chief Design Engineer,
and
P. B. Crommelin,
Operations and Services Engineer,
Research-Cottrell, Inc.
Bound Brook, N. J.

The use of the electrostatic precipitator as an integral unit of the recovery system in a kraft mill installation, has become general practice during the past 20 years. Over 75 different paper mill plants in North America have incorporated operating precipitators in their installations during this period. The primary objective of the precipitator is to recover a valuable chemical which otherwise would be lost through stack discharge. It is impressive to note that the dollar value of recovered material provided by Cottrell precipitators alone in the pulp and paper industry currently amounts to something in the neighborhood of over $30,000,000 annually. The magnitude of this value to the paper mill industry in general, and to the individual plant in particular, brings into sharp focus the necessity and importance of proper maintenance for an operating precipitator. A good maintenance program will assure a high degree of operating availability with maximum recovery of collected chemical.

Most of the items of precipitator maintenance are relatively simple and inexpensive; and yet, if not properly evaluated and therefore overlooked, their neglect can result in an unnecessary loss of the valuable materials and the possibility of more expensive repairs at a later date.

Before giving any itemization of the maintenance required for a precipitator, it might be well to review briefly its major components. The principal parts of a precipitator in-

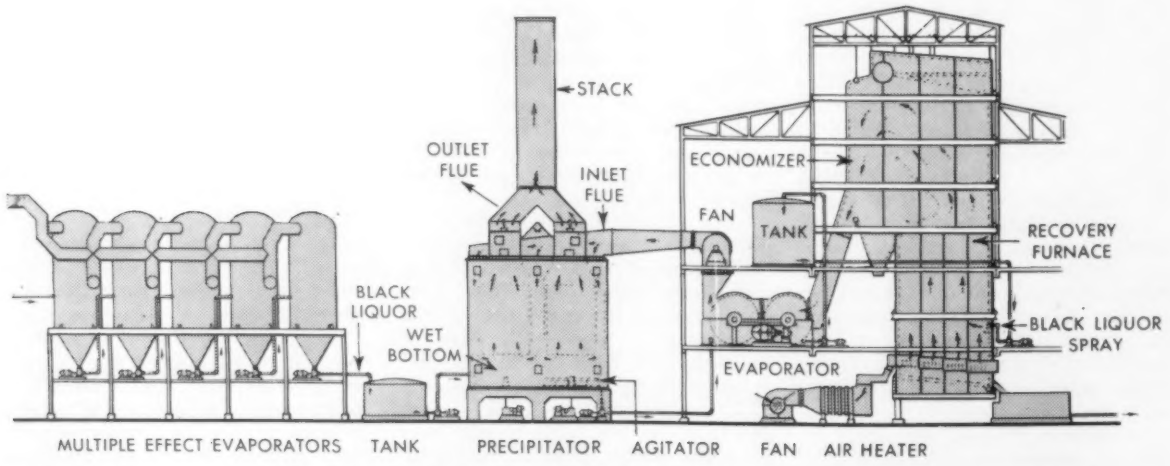


Figure 1: How an electrostatic precipitator is typically integrated into the black liquor recovery system in a kraft mill.

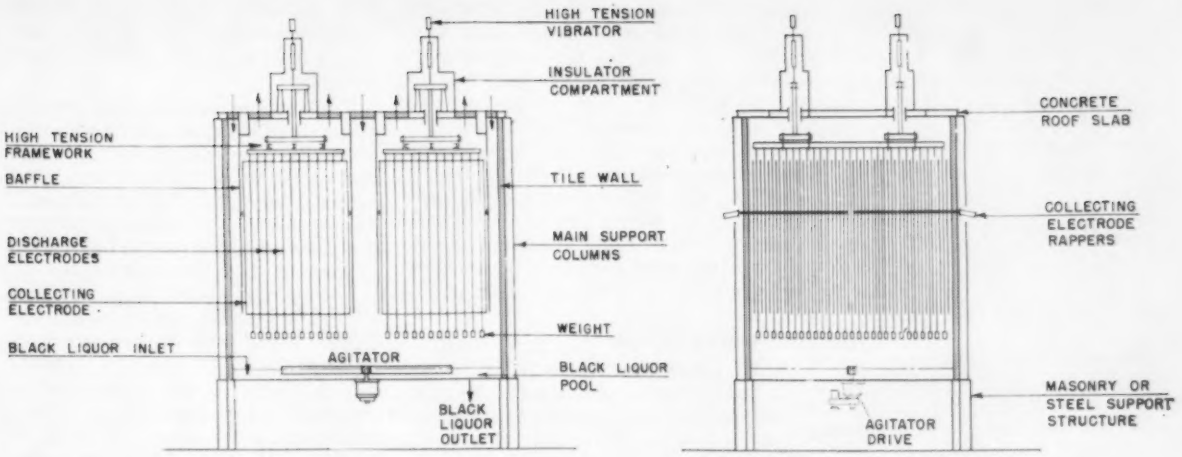


Figure 2 showing principal parts of the wet bottom type electrostatic precipitator.

stallation for pulp mills (Figure 2) are as follows: (1) equipment for the generation of the proper required electrical energy; (2) the discharge electrodes and the associated collecting electrodes for precipitating the suspended dust particles from the gas under treatment (3) a housing which encloses and gives support to the electrodes, and which properly channels the gas through the treating zone of the electrodes; (4) means for dislodging the collected dust from the electrodes; and (5) an arrangement for disposal of the collected material.

Tile Shell

Early experience in the use of paper mill precipitators pointed out the need for the design of a shell which would stand up against serious corrosion attack. During the pilot plant stage of development, a steel shell was used to enclose the precipitator proper. However, rapid corrosion was experienced on the interior surfaces of this steel shell due to condensate formation on these surfaces, which were subject to cooling due to radiation. To overcome this situation, the choice was made to use vitrified tile for the shell construction. Experience has proven the wisdom of this choice, although in some instances deterioration of portions of the tile has occurred where abnormally low gas temperatures existed for prolonged periods of operation, or where conditions of wall wetting were permitted to continue without correction.

Thus, it is evident that a principal objective is to maintain gas temperature sufficiently above the dew point of the gas to retard the formation of condensate. Gas temperature in the precipitator should be held as close to 300° F. as plant operation will permit. Another condition of wetness on the inner tile surfaces may occur when the precipitator is out of service for extended periods and doors into the precipitator are left open. With humid atmospheric conditions, condensate may form on the tile surfaces, and be absorbed into the salt cake layer clinging to the wall. Should such an extended shutdown be required, all tile surfaces should be cleaned of salt cake accumulation before operation is resumed. Then whatever condensate has formed can be quickly evaporated as soon as hot gas is passed through the shell. A third source of wetness on the interior tile surface may occur from an external cause, such as, for example, rain water leakage through a flue connection joint at the precipitator roof. Any moisture leakage into the precipitator should be carefully eliminated.

To keep the tile shell walls in top condition a continuing program of wall maintenance should be carried out. Careful inspection of the entire interior wall surface should be made once a year for the purpose of noting the start of any deterioration. If a random tile is found to have a defective interior face such that the tightness of the wall is impaired, the face should be removed and the area patched with Lumnite mortar to restore the tightness of the wall. If deterioration of any interior joints between tiles is noted, the joint should be cleaned out thoroughly and repointed with Lumnite mortar. In summation, the interior wall surface should be maintained in as watertight a condition as possible.

Similar inspection should be done on the exterior tile wall surfaces, and if repairs of random tiles or joints between tiles are indicated they may be made with Portland mortar. Repairs on the exterior can be made quite simply and readily, and should be taken care of on an annual schedule.

In very extreme cases with old precipitators where more extensive repairs are needed there are two methods which offer the best possibilities. One is the application of a Lumnite gunite lining over the deteriorated areas; the other is relining with dense acid-proof liner slabs. Both methods have been used with successful results however, relining with acid-proof slabs appears to offer the promise of a longer lasting repair.

Discharge Electrodes

A very important factor in the operation of a precipitator at maximum collection efficiency is the proper alignment of the discharge wires, or electrodes, in the various ducts formed by the collecting plates. The optimum condition, of course, would be with each wire or electrode exactly centered between its adjacent collecting plates. As a practical criterion misalignment by 1/8 inch from the exact centerline of the duct is not particularly detrimental. Misalignment to any greater extent, can cause a "hogging" of power by individual electrodes and a corresponding loss of power in the remaining framework resulting in a loss in collection efficiency.

On the older type precipitators there have been occurrences of poor alignment caused either by a shifting of the entire high tension frame-

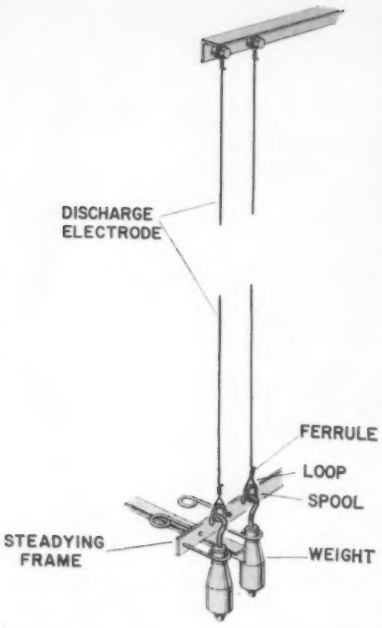


Figure 3: Loop-spool type of discharge electrode reduces wire abrasion, "split-arc" burning and work hardening failures.

work at its top support or by damage in the form of bending of members making up the bottom wire steadying framework. The opportunity to make an inspection of discharge electrode alignment presents itself several times a year during periods of plant shutdowns. A careful inspection at the lower ends of the wires will quickly reveal any poor centering, and if noted it should be rectified as soon as possible.

The failure, or breaking, of individual discharge electrodes was once an occurrence of fairly common knowledge in precipitator operation. The immediate consequence of a wire failure is the shorting out of the electrical section containing the failure. If the broken wire does not clear itself it must be removed before the section can be placed back in electrical operation. The principal cause of wire failure was mechanical overstress of the wire at a critical point in the length of the wire, generally adjacent to the top or bottom ends of the wire. This overstress was directly related to the movement or vibration of the wire imparted by the discharge electrode rappers. In recent years, significant improvement has been made in the design of discharge electrodes which essentially eliminates the occurrence of this type of failure. The principal feature of this new design (Figure 3) is the use of looped ends on the wire with a protective spool inside each loop. The resulting benefits are two-fold; first, the protecting spool relieves the possibility of wire abrasion and "split-arc" burning, and secondly, the loop arrangement provides a loose joint connection at the two ends of the wire which eliminates the possibility of failure due to work hardening which might otherwise occur from repeated flexing adjacent to a rigid point of wire connection.

Rapping Equipment

Of prime importance in operating a precipitator at mixumum collection efficiency is the necessity to maintain the collecting plates and discharge electrodes in a relatively clean condition. Rapping equipment, which performs this important function, should be subjected to a rigid preventive maintenance program. An inspection of each rapper, to note if it is in proper operation, should be made during every shift.

As a general rule, pulp mill precipitator rappers (Figures 4 and 5) are of the pneumatically-operated type. The two types in most common use are the reciprocating vibrator and the ball-type rapper. The reciprocating vibrator is often used for both collecting plate and discharge electrode cleaning. The ball-type rapper is used only for collecting plate cleaning.

The rapping arrangement consists of a rapper attached to a shaft which transmits the rapping blow or vibration to the elements from which the collected salt cake is to be dislodged. The connection between the rapper and the end of the shaft is by means of welding. Also, the plate rapper bar is welded to the edge of each collecting plate inside the precipitator. These welds should be carefully checked during inspection periods and if there is any indication of cracks at any of these points, repair of the connection should be made at the time. The plate rapper bar welds can be checked during shutdown periods.

Since the high tension rapper rod is connected to the high tension framework, a means is provided to isolate the rapper mechanism from the high potential. In the more modern units, a porcelain shaft is incorporated as part of the rapper rod for this purpose. This allows the rapper to be placed externally and available for servicing at all times. This porcelain shaft is fastened to the lower and upper portions of the vertical

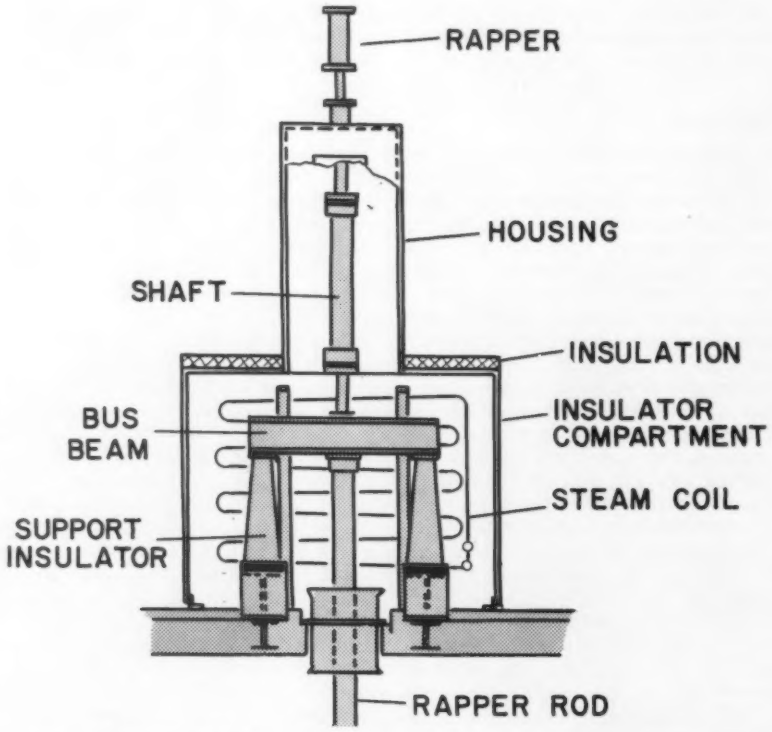


Figure 4: Diagram of a typical discharge electrode rapper system for an electrostatic precipitator.

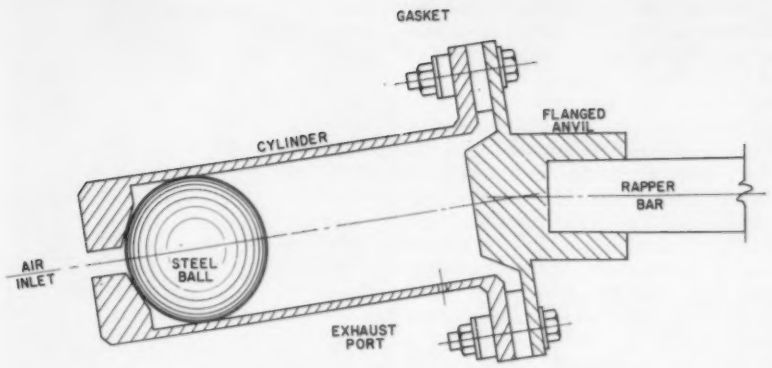


Figure 5: The ball type rapper, used only for collecting plate cleaning, requires a minimum of maintenance, yet withstands severe and rigorous service.

rapper rod by means of friction type clamps. For proper rapping transmission, it is imperative that the clamps be securely clasped to the porcelain shaft. During the cleaning routine of the support insulators in the insulator compartments, a careful examination should made of these clamps and if there is an evidence of their loosening, they should be readjusted and tightened.

In older installations, the high tension rapper is mounted directly on the high tension framework, and thus is subject to the high potential. A rubber air supply hose is used to isolate the rapper from ground potential. In arrangements of this type a dry air supply is mandatory, since condensation on air hose surfaces will cause arc-over and failure of the hose, the resultant shorting out of the precipitator section.

With rappers located externally from the precipitator shell, stuffing boxes are provided to permit fairly tight passage of the rapper bars through the shell. Although these stuffing boxes should be kept tight enough to prevent excessive gas leakage or air inleakage, they should not be pulled up so tight that they will restrain easy movement of the rapper bar through the packing. New packing should be installed annually, or sooner, if there is evidence that the old packing has lost its resiliency.

One of the more difficult problems in connection with pulp mill precipitators has been the design of rapping equipment which will withstand severe and vigorous service with a minimum of failures and maintenance. The development of the ball-type plate rapper (Figure 5) has resulted in a long step in this direction. Maintenance of the rapper itself is practically negligible. The only possibility of malfunction is an excessive accumulation of dirt and foreign matter within the rapper cylinder, and even this may be prevented by periodic cleaning of the filter which is incorporated in the compressed air supply line ahead of each rapper. Since no lubrication is required, there is no possibility of ball sticking due to gummy deposits. The once-a-shift inspection of each rapper should include a check on solenoid valve operation and a check of the regulator dial for proper compressed air pressure supply.

Proper maintenance of the reciprocating vibrator, however, requires a much more careful routine of surveillance during each once-a-shift inspection. A check on the tightness of the mounting bolts and the tie rods which clamp the end blocks of the vibrator together should be made each week. Also of major importance is the supply of proper lubrication to the vibrator, and thus the lubricator should be observed as to whether one or two drops of oil is being provided during each operation of the vibrator. The inspection should also include a check on solenoid valve operation, as well as a check on compressed air pressure supply.

The rapping timing equipment requires little care except for occasional lubrication and infrequent replacement of worn parts.

Insulator Compartments

A basic feature of any precipitator is the provision of an enclosure for the ceramic insulators which electrically isolate the high tension framework from the grounded portion of the structure. These enclosures, or insulator compartments, must provide protection for the insulators against dirt and wetting, since the insulator must be kept reasonably clean and dry to assure its effectiveness. In the pulp mill precipitator, the space within an insulator compartment has direct connection to the dirty gas chamber by way of orifices through which pass the vertical hangers for the high tension framework. To prevent, or at least minimize, the entrance of dirty gas into the campartment, provision is made for a counterstream of ventilating air to pass through the compartment and then through the orifice where the air mixes with the main body of gas in the treating zone of the precipitator.

Where a precipitator is under suction operation (that is, the induced draft fan is downstream from the precipitator) the provision for this ventilation is relatively simple, consisting merely of a hooded orifice in the top side of the compartment through which the required air is induced by the suction within the precipitator. It is necessary to check occasionally to see that these air inlets are open and permitting air to enter.

For precipitators operating under pressure (in this case with the induced draft fan upstream from the precipitator), ventilation is provided by a small forced draft fan with connecting ductwork between the fan and the various compartments. To assure that proper ventilation is being provided, the ventilating fan should be checked every shift. Since the ventilating fan is providing air to several compartments, small regulating dampers are provided in the ductwork just ahead of each compartment so that air may be distributed equally to all compartments. Generally, these dampers are set to proper adjustment during the initial start-up of the precipitator, and the desired setting is marked on the duct for future reference. Occasional checks should be made of the damper settings to note if they have been inadvertently moved. The ductwork should also be checked and repaired, if necessary, to keep it airtight. Periodic painting will, of course, add appreciably to the life of the ductwork.

A further protection for the insulators is a steam coil provided within the compartment. This steam coil is designed to provide sufficient heat to prevent the formation of condensate on the insulators. The heating system is particularly important during short outages of the precipitator. The steam supply should be left on continuously. A check should be made each shift to see that proper heating is being provided to each compartment. This check may be readily accomplished merely by feeling the

steam line at its entrance to the compartment. If a steam leak develops in the line to a compartment, it should be repaired at the time it is noticed, for it can cause a waste of steam and act as a source of moisture which may find its way into the precipitator proper.

Although the provision of ventilation for the compartment is quite fully effective in preventing dirty insulators, some dirt does find its way to the insulators. Generally this is from outside air.

Since conditions vary considerably from plant to plant, it is difficult to establish beforehand the necessary cleaning frequency for insulator compartments. It is usually possible to maintain clean compartments merely by performing such cleaning during normal shutdowns. The cleaning routine should include a thorough cleaning of the bus beam insulators as well as the porcelain shaft of the high tension rapper arrangement. Loose dirt should also be removed from the compartment walls and floor.

Collecting Equipment

Up to about 10 years ago, the general arrangement for collecting the dislodged salt-cake was by means of hoppers located at the bottom of the precipitator. About 1948, the wet bottom was developed, and since its advantages were so numerous, the use of hoppers became practically extinct on the more modern installations. In fact, many of the old hopper installations have already been converted to wet bottom units. This conversion can be made quite readily. However, there still remain a number of precipitators continuing to operate with hoppers.

The principal problems with hoppers are (1) corrosion and (2) difficulty with free-flow of material from the hoppers. Both problems may be partially overcome by proper steam tracing and heat insulation of the hopper exterior, and subsequent care that a constant steam supply to the hopper coils is being maintained, and that damaged heat insulation is properly repaired.

Proper maintenance of the wet bottom is a fairly simple item. Although the wet bottom agitator is quite efficent in mixing and dissolving the collected salt-cake into the black liquor, instances may occur where some salt-cake sediment will accumulate on the floor of the wet bottom pool, particularly in corners away from the rotating agitator. Advantage should be taken, during periodic shut-downs of the precipitator, to drain all the liquor from the wet bottom and to clean out all accumulations of salt-cake and sediment which may be found present on the floor of the wet bottom pan.

As a rule, the wet bottom pan is of mild steel construction, and the floor plate of the pan is left exposed to the black liquor. Mild steel is considered satisfactory in most instances for this construction, since the black liquor is generally alkaline in nature and does not attack ordinary steel. On some installations the vertical sides of the pan are covered with a facing of acid-proof brick, which serves to give additional protection to the steel pan which projects above the top surface of the black liquor pool. Periodic checks should be made of the structural soundness and tightness of the acid-proof lining, and Lumnite mortar of a 1:2 mix should be used for resetting any brick which may be found in a loosened condition. Sand employed for the Lumnite mortar mix should be of 90 per cent minimum silica content.

The wet bottom agitator drive requires a minimum of maintenance. The oil level in the gear reducer should be checked in accordance with the manufacturer's recommendation, and oil changes made as needed. Bearings should be greased and checked occasionally.

The wet bottom liquor level control generally consists of an external float chamber with a float-actuated level controller. Occasionally, soap will accumulate in the float chamber which should be cleaned out at frequent intervals. To prevent the black liquor from congealing in the float chamber, it is important that a small supply of hot liquor be continually fed to the float tank. A daily check on the temperature of the piping between the wet bottom and the float chamber will permit detection of any liquor congealment in the piping.

Drag chain arrangements have also been used on some precipitators for dust removal. The maintenance requirements of such systems are generally quite high, since the mechanical parts in the gas stream are continually exposed to corrosive and erosive conditions.

Electrical Equipment

Maintenance of the electrical energization equipment is principally a matter of cleanliness. All insulators should be cleaned on a regular schedule to prevent possible flash-overs and consequent damage of the ceramic. The frequency of cleaning must be determined by operating experience. The best cleaning of glazed porcelain may be accomplished with a damp cloth and a non-abrasize type cleaner such as Bon Ami. Rectifier tube maintenance likewise requires periodic cleaning of the gas envelope to minimize surface leakage and to maintain a high degree of heat radiation from the tube. For trouble-free operation, it is important that the control unit be kept free of excessive dust, and where an air filter assembly is furnished for the control unit, the filter should be examined at regular intervals and replaced when necessary.

At least once a year, all relay contacts in the control unit should be cleaned and dressed with a fine grade of crocus cloth and rechecked for calibration.

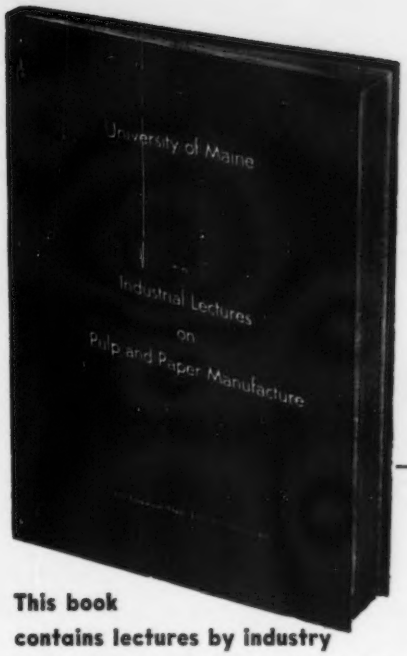
Transformer maintenance should include a periodic check of the liquid level, and the addition of insulating liquid when the level drops too low, as well as a yearly check of the dielectric strength of the liquid.

Where synchronous mechanical rectifiers are used, care must be taken to keep the rectifier room warm and dry. Frequent cleaning of rectifier components is necessary to prevent flash-overs. In most plants this is done twice a week. Rectifier gaps should be maintained at between ⅛ inch to 3/16 inch to minimize voltage drop across the rectifier. Because of the high current demand, rectifier rotor tips and arc shoes are subject to substantial wear. Although the maintenance requirements for mechanical rectifiers are quite high, they will give satisfactory service when properly cared for.

In Summary

The incorporation of an electrostatic precipitator in the pulp mill recovery plant is an item of appreciable cost. As a properly operating unit, it represents a most substantial saving of valuable chemical which otherwise would be lost, as well as abating a highly undesirable nuisance to surrounding areas. A proper appreciation of these factors should serve as adequate stimulation to maintain the precipitator at its maximum operating efficiency and availability, and to prolong its life for as long as possible. Most of the items discussed are of an important preventive nature, and if diligently observed will translate themselves into substantial savings.

Although the routine maintenance of a precipitator is quite simple and requires relatively little labor expenditure, the importance of good maintenance carried out on a rigid schedule cannot be overemphasized.



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Sulfate Recovery Units
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Peroxides
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Corrosion-Resistant Metals for Pulp and Paper Industry
Application of Chemical Engineering To Pulp and Paper Technology

PAPER SECTION

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Fillers and Loading
Paper Fillers
Starch Sizing of Paper
The Dyeing of Paper
Coarse Papers Bag and Board
Coarse Papers
Sanitary Tissues
Instrument Applications in Pulp and Paper Mills
Fourdrinier Paper Machines—Wet End
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Delivered Basis

	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$ 82.50/ 90.00	$82.50/ 90.00	§$90.00/ —	§$80.00/ —	§$90.00/ —
Bleached Gw'd	$ 97.50/100.00	$97.50/100.00			
Kraft, Blchd.	‡152.00/160.00				§157.50/ —
Kraft, Blchd. Hdwd.	152.00/ —		140.00/ —		
Kraft, Semi-bleached.	140.00/145.00				
Kraft, Unbl.	117.50/125.00	125.00/130.00	†125.00/130.00	125.00/ —	
Sulphite, Blchd.	‡150.00/155.00	‡150.00/155.00	*155.00/ —	*155.00/ —	155.00/ —
Sulphite, Bl. Hdwd.	150.00/ —				
Sulphite, Unblchd.	135.00/ —	135.00/ —	†135.00/ —	*135.00/ —	
Sulphite, Unb'l. Gl'sn		140.00/ —	†134.00/ —		
Soda, Blchd.	147.00/150.00	150.00/ —			

§ On Dock Atlantic Ports. * Freight allowed. † Varying Freight Allowances.
‡ Depending on Brightness.

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F.O.B. OIL MILLS
WEEK ENDED APRIL 5

	Atlanta	Memphis	Dallas	Los Angeles
Grade 1	n.a.	n.a.	n.a.	n.a.
2	n.a.	n.a.	n.a.	n.a.
3	$7.50/7.00	$8.50/7.75	$7.50/7.00	n.a.
4	7.00/6.25	7.25/6.25	6.50/6.25	8.50/ —
5	6.25/5.75	6.00/5.50	6.00/5.50	8.00/7.00
6	5.75/4.75	5.25/5.00	5.25/5.00	6.50/4.50
7	4.75/4.25	4.50/4.00	4.75/4.00	4.25/4.00

WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point — Includes Brokerage

These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers and brokers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	Apr. 11	Apr. 11	April	April
No. 1 Mixed Paper	$ 7.00/ 9.00	9.00/ 11.00	8.00/ —	12.00/ 13.00
No. 1 News	14.00/ 15.00	14.00/ 15.00	16.00/ —	12.00/ 13.00
Overissue News (Lg. size)	13.00/ 15.00	13.00/ 15.00	21.00/ —	19.00/ 20.00
Mill Wrappers	19.00/ 22.00	13.00/ 15.00	11.00/ —	14.00/ 15.00
Old Corrugated Containers	22.00/ 23.00	21.50/ 22.00	20.00/ —	23.00/ —
Super Resorted Kraft Paper	35.00/ 40.00	— / —	30.00/ —	55.00/ —
New Double Kr. Ld. Corr. Cuts	32.50/ 35.00	35.00/ —	32.50/ —	35.00/ —
(Semi-chem. medium)	45.00/ —	45.00/ —	42.50/ —	— / —
New 100% Kraft Corr. Cuts	40.00/ 42.50	— / —	57.50/ —	— / —
New Br. Kraft, Env. Cuts	70.00/ 75.00	70.00/ 75.00	52.50/ —	55.00/ —
New Br. Kr. Bag Waste Prntd.	55.00/ 60.00	55.00/ 60.00	52.50/ —	55.00/ —
New Br. Kr. Bag Waste Unprintd.	60.00/ 65.00	65.00/ 75.00	60.00/ —	60.00/ —
No. 1 Groundwood Shvs.	25.00/ 30.00	25.00/ 30.00	20.00/ —	32.50/ 35.00
White Newsblanks	50.00/ 55.00	50.00/ 55.00	35.00/ —	60.00/ —
No. 1 Soft White Shvs.	60.00/ 65.00	57.50/ 60.00	60.00/ —	70.00/ 75.00
Super Soft White Shvs.	65.00/ 75.00	75.00/ 85.00	70.00/ —	— / —
Hd. White Shvs.	85.00/ 90.00	90.00/100.00	85.00/ —	95.00/ —
Hd. White nv. Cuts	100.00/105.00	105.00/110.00	90.00/ —	113.00/ —
Col. Tab. Cards	42.50/ 45.00	42.50/ 45.00	47.50/ —	40.00/ 45.00
Manila Tab. Cards	62.50/ 65.00	62.50/ 65.00	65.00/ —	70.00/ 75.00
No. 1 Col. Ledger	37.50/ 42.50	37.50/ 42.50	42.50/ —	29.50/ 32.50
White Ledger	50.00/ 55.00	52.50/ 57.50	52.50/ —	55.00/ —
Mixed Book & Mag.†	22.00/ 25.00	— / —	14.00/ —	— / —
No. 1 Books‡	19.00/ 21.50	17.00/ 19.00	30.00/ —	16.50/ 18.50

† Includes Time & Life; no coarse groundwood. § Not to exceed 10% of groundwood.

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PJT NEWS OF SUPPLIERS

American Hoist & Derrick Co., Saint Paul, Minn., has acquired the Industrial Brownhoist Corp., Bay City, Mich., according to John E. Carroll, president of American. The transaction was effected by purchase of the outstanding stock of Industrial Brownhoist for an undisclosed amount. Mr. Carroll stated that the range of products manufactured by the Michigan firm complement those built by American Hoist.

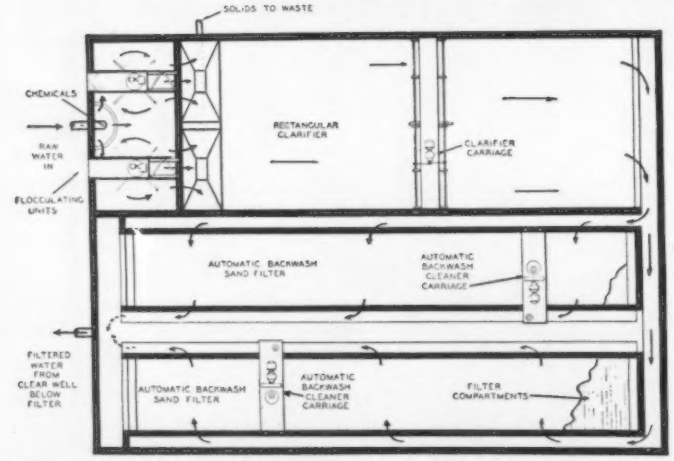
Industrial Brownhoist will be operated as a wholly owned subsidiary of the purchaser, effective immediately, and operations will continue at Bay City.

Joseph T. Ryerson & Son, Inc., steel and aluminum distributor, has appointed William P. Loenrer district sales manager of the Chicago plant. Succeeding him as manager of alloy and stainless steel sales, Chicago plant, is G. Phillip Later. Bruce D. Clausonthue is appointed manager of the general order division, Chicago. He takes over this post from Donald E. Woodruff who has been transferred to the company's general office, also in Chicago, pending new assignment to be announced later.

Fischer & Porter Co., Warminister, Pa., has named R. Henry Seelaus vice president, finance. Mr. Seelaus joined Fischer & Porter in January 1955 as controller, was appointed secretary and treasurer in October 1957 and elected to the board of directors in September 1959. Mr. Seelaus will still serve as secretary of the company.

Mr. Seelaus is a graduate of Wharton School, University of Pennsylvania (1942) and is a member of the Controllers Institute of America and the American Management Ass'n.

COMPLETE WATER TREATMENT



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Huyck Felt Co., Rensselaer, N. Y., announces the promotion of James B. Northrop to assistant to the general manager. His new duties will involve working closely with all departments at the Rensselaer mill.

Since joining Huyck in 1953, he has served as chief industrial engineer and assistant plant superintendent. His broad experience in all phases of papermakers' felt manufacture has prepared him well for his new assignment. He is an alumnus of the University of Florida.

J. B. Northrup

A. J. Smith

Midland Ross Corp. has appointed A. Justin Smith, sales engineer for Ross Midwest Fulton Division, sales manager for the division.

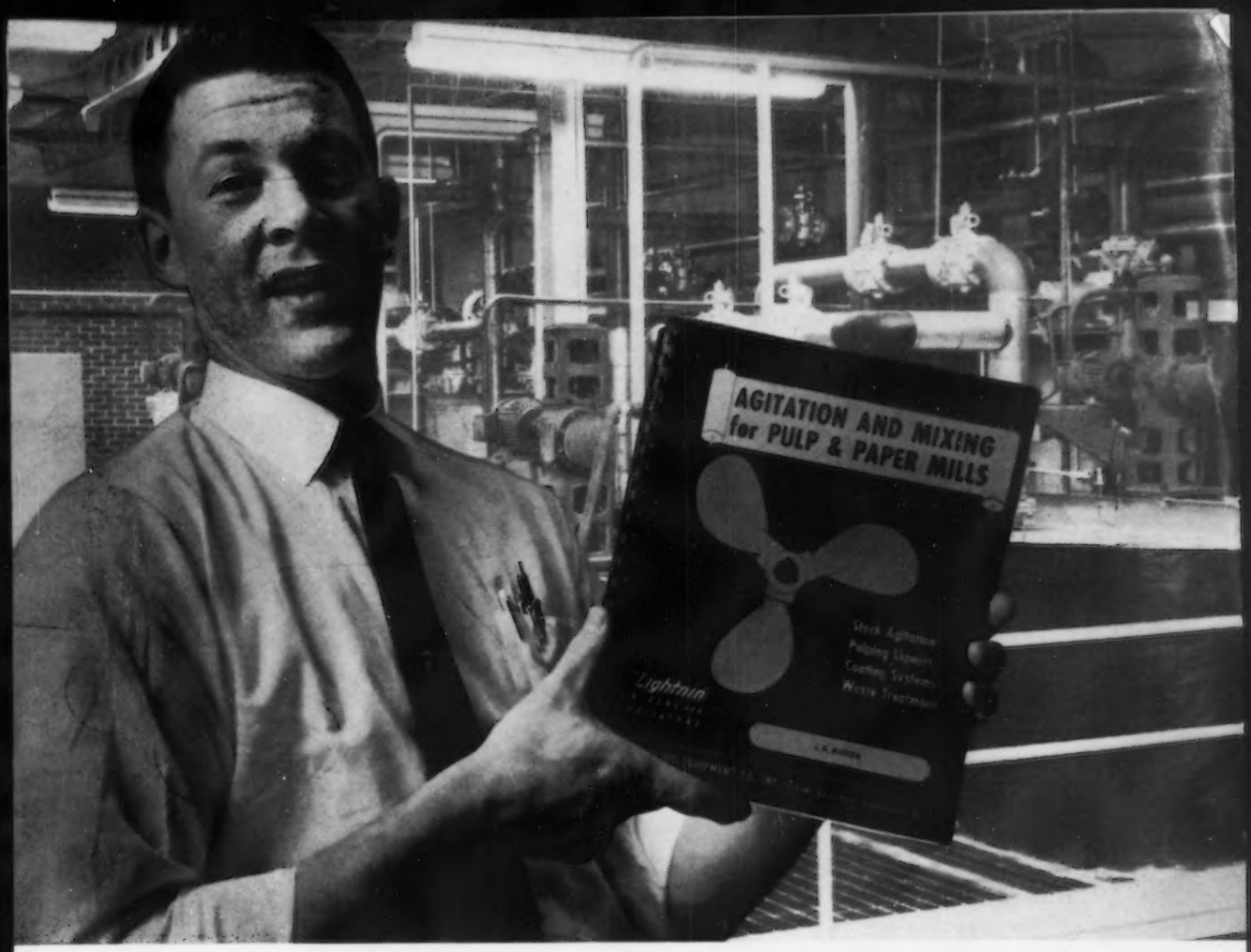
Mr. Smith joined the Ross Midwest Fulton staff in 1951 and was assigned to the territory of the Southern United States.

Previously, he had been with Commonwealth Engineering Co., Dayton, Ohio, from 1950 to 1951; Inland Mfg. Division, General Motors Corp., Dayton, Ohio, from 1946 to 1950; and Miamisburg Paper Co., now a division of Kimberly-Clark Corp., West Carrollton, Ohio, from 1934 to 1942.

Pennsalt Chemicals Corp. announces that Hugh C. Land, formerly general manager of Pennsalt's Industrial Chemicals Division, has been elected a vice president. Upon the retirement of Fred C. Shanaman as group vice president, West, on April 27, Mr. Land will succeed Mr. Shanaman and will make his headquarters at Tacoma, Wash. Mr. Land will have jurisdiction over the two Western operating divisions, Agricultural Chemicals and Industrial Chemicals-West.

Lee H. Clark, formerly vice president in charge of administrative services, has been named group vice president, East, with jurisdiction over the three Eastern operating divisions, Chemical Specialties, Industrial Chemicals-East and International.

Allis-Chalmers Mfg. Co. has appointed W. C. Henderson manager, utility sales, and A. W. Leighton



Getting the results you want from agitated chests and tanks is the subject of this new 112-page manual.

Complete, factual, informative, it is the first book of its kind ever written for pulp and paper engineers. It is based on ten years of unique research into the technology of mixing and agitation in the pulp and paper industry, and on hundreds of mill installations, many of which it describes and illustrates.

Anyone in the industry whose work involves agitation or mixing can get a copy free and without obligation by writing to us on his company letterhead.

Here is a partial list of the contents

PAPER STOCK AGITATION. Defining process results, complete uniformity in stock chests, complete motion, controlled zone agitation, side-entering agitators, stock consistency and power requirement, impeller selection, consistency control in continuous systems, performance and design of paper stock mixers.

Case examples. Machine chests, storage chests, blending and mixing chests, mixing boxes.

High-density storage, bleaching, blow pits and blow tanks, couch pits, repulpers.

PULPING LIQUORS. Fluid dynamics: blending, heat transfer, solids suspension, dissolving, gas-liquid operations, liquid-liquid contacting.

Case examples. Green liquor storage, salt cake dissolving, bleach liquors, lime storage, bleach liquor storage, smelt dissolvers, sulfur melters, waste neutralization and oxidation.

COATING SYSTEMS. Clay makeup, clay storage, starch cooking and storage, coating storage, dye solution tank, coating blender.

EQUIPMENT DESIGN. Basic design factors, basic mixer components, materials of construction, vertical installations, horizontal installations.

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ALBANY, N. Y.

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Yesterday's
RESEARCH
is paying off
in production
TODAY!

Yes, Albany Felt Company's fellowship in one of the country's leading industrial research institutes is really paying off for you. For example, one problem that has plagued manufacturers of tissue grades for years has been that of obtaining *fast start-ups*. Albany Felt's Research and Development Staff finally developed a special chemical treatment called "U-31" which, when applied to Pickup and Wet Felts on Yankee Fourdrinier Machines, permitted much faster start-ups than obtained with non-treated felts. Even after the start-up, "U-31" also allowed much higher speeds throughout the life of the felts than ever before believed possible.

Another pay-off of Albany's Research "U-31"

"U-31", once just a "possibility" which Albany Felt Company Research Chemists were seeking, is now a reality as so many mills are discovering.

New Ideas for Better Paper Making

Ask your Albany Felt Sales Engineer about our "U-31" treatment today! You'll be glad you did!

manager, industrial sales, Los Angeles district, Allis-Chalmers Industries Group.

Mr. Henderson, who succeeds Mr. Leighton as manager of utility sales, had been a sales representative in the Los Angeles district since 1953.

Mr. Leighton had been manager of utility sales since 1956. He was transferred to the Los Angeles district in 1953 as a sales representative after working in the Kansas City and Cleveland districts.

Patton Manufacturing Co., Springfield, Ohio, has appointed Herman Levin, formerly director of engineering for Pusey & Jones, to the position of field engineer for its Paper Mill Machinery Division. Mr. Levin has spent the past 14 years in the engineering of pulp and paper mill machinery.

Mr. Levin joined Pusey & Jones, a Wilmington, Del., paper mill machinery manufacturer, in 1946 as a machinery designer and moved up through the ranks. He served various lengths of time as squad leader, group supervisor, chief draftsman, assistant chief engineer, and chief engineer. He was the firm's director of engineering for two years prior to his move to Patton.

Figures of the Week

PAPER PRODUCTION RATIO REPORT—American Paper & Pulp Assn. Figures
(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

		Mar. 5	Mar. 12	Mar. 19	Mar. 26	Apr. 2
	1960	97.3	97.5r	98.6r	99.5r	97.3
		Mar. 7	Mar. 14	Mar. 21	Mar. 28	Apr. 4
	1959	91.8	93.9	94.1	92.9	90.4

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	96.7	97.9	98.1‡	—	—	—	—	—	—	—	—	—	—
1959	87.8	90.5	93.2	94.4	95.5	95.6	84.5	96.0	92.4	97.4	96.2	86.6	94.0

‡ Preliminary

COMPARATIVE YEARLY SUMMARIES

	1953	1954	1955	1956	1957	1958	1959	1960
Year to Date	94.5	94.1	96.2	101.2	96.0	88.6	90.2	97.6
Year Average	92.3	91.6	96.2	97.9	90.4	87.0	94.0	—

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available.

PAPERBOARD OPERATING RATIOS†—National Paperboard Assn. Figures

COMPARATIVE WEEKLY SUMMARIES

		Mar. 5	Mar. 12	Mar. 19	Mar. 26	Apr. 2
	1960	94	94	94	93	91
		Mar. 7	Mar. 14	Mar. 21	Mar. 28	Apr. 4
	1959	96	93	94	95	89

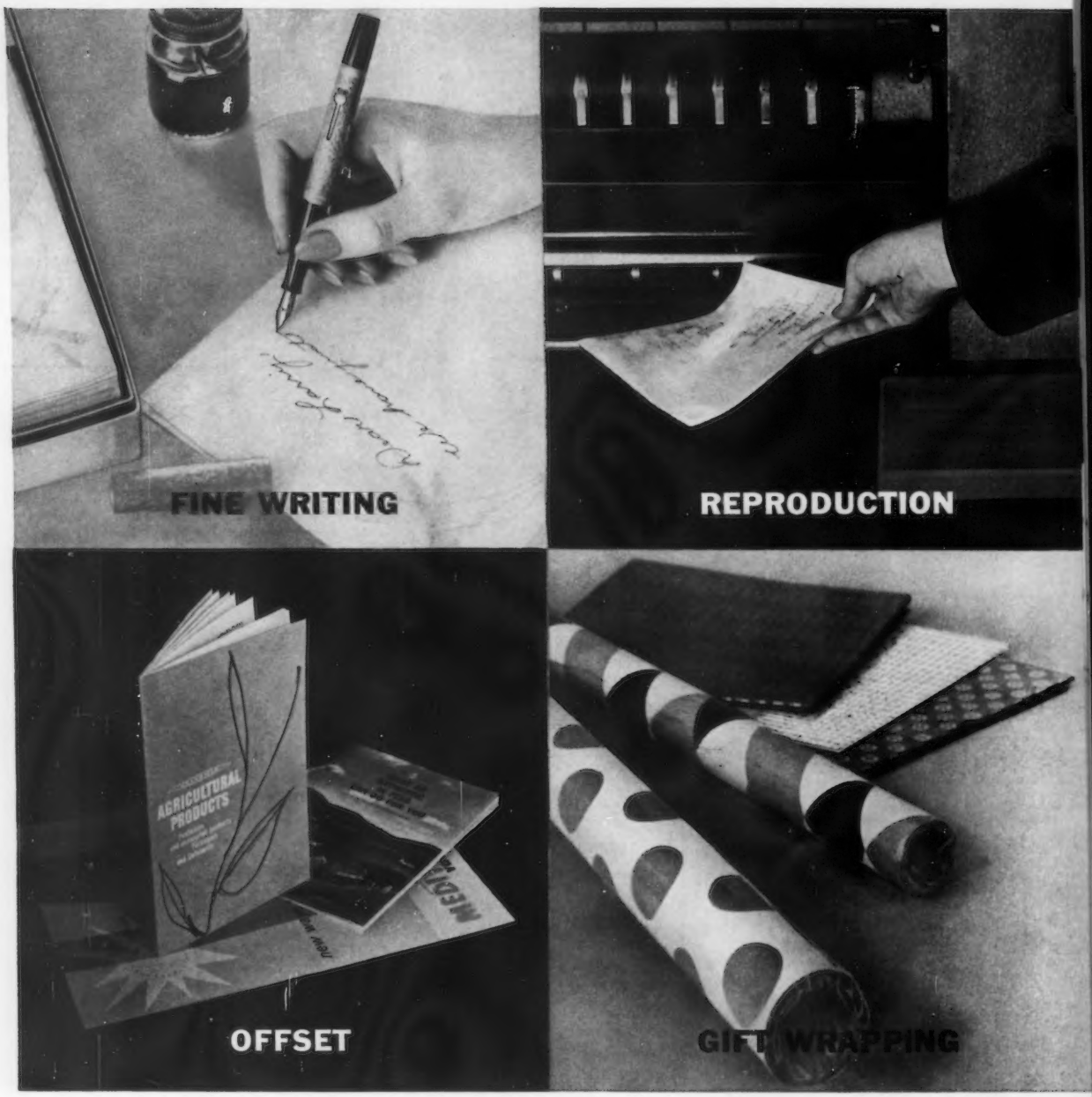
COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1960	92	95	—	—	—	—	—	—	—	—	—	—	—
1959	89	94	95	94	96	96	83	97	92	97	94	80	92

† *Per cents of operation based on "inch-hours" reported on a 6-day basis to the National Paperboard Association.*

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Assn. Figures

ITEM	THIS WEEK ENDING Apr. 2, 1960	LAST WEEK ENDING Mar. 26, 1960	CUMULATIVE TO DATE Jan. 1 to Mar. 2, 1960, incl.
% Activity	91%	93%	93%
Total	304,514	316,264	4,107,659
Containerboard—Domestic Use	151,790	155,557	2,109,520
Liner	101,436	100,206	1,410,133
Corrugating Material	44,556	50,192	632,453
Chip & Filler Board	5,798	5,159	66,934
Boxboard—Domestic Use	102,018	102,523	1,288,900
Folding	61,242	61,687	768,627
Set-Up	12,708	9,962	147,191
Special Food Board	28,068	30,874	373,082
Other Paperboard	50,706	58,184	709,239
Containerboard Type	24,202	27,433	336,978
Boxboard Type	26,504	30,751	372,261
Total Orders			
Received	354,126	300,817	
Unfilled End of Week	467,129	418,526	



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Name your paper—and Alberta HI-BRITE Pulp will help you make it better! Now proved in more than one hundred North American paper mills, Hi-Brite is truly the modern pulp for modern, quality papers.

Why does Hi-Brite do so much more than ordinary pulps? *First,* it's produced exclusively from northern spruce and lodgepole pine. *Second,* Hi-Brite pulp is "cold-blown" from Kamyr continuous digesters to preserve the bonding strength of the long, thin fibers. *Third,* Hi-Brite's ultra-modern bleaching process actually improves the inherent strength of the unbleached fibers.

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unique combination! The result—a uniform pulp of gleaming whiteness with outstanding bonding properties!

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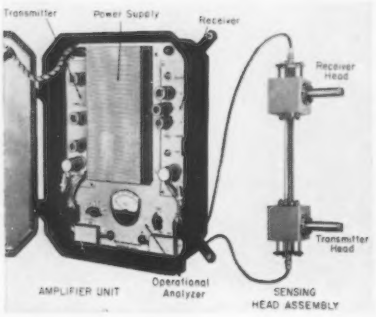
KRAFT DIVISION

St.Regis PAPER COMPANY

NEW EQUIPMENT & SUPPLIES



Instrument Detects Bubbling in Liquids

The Ultrasonic Bubble Detector can be used to detect undesirable or controlled bubbling in almost any liquid, in open or closed vessels, pipes or flumes. Whether the liquid is static or flowing does not affect instrument efficiency. The bubble detector can be coupled with any type of indicating, recording or controlling instrumentation, or simply with some type of alarm.

The sensing head assembly, located at the process, is cable connected in a continuous loop with the amplifier unit, which may be remotely located. A pulsed ultrasonic signal passes through the liquid which is likewise flowing between the transmitter and receiver heads. The presence of bubbles naturally weakens or interrupts the signal.

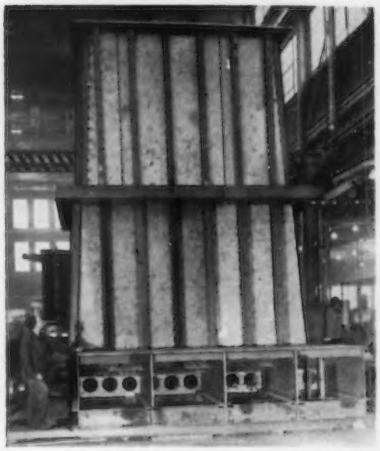
The amplifier unit is comprised of four sub-assemblies: a transmitter (the source of the signal passing through the head assembly); a receiver amplifier (which accepts the signal from the receiver head and provides a stabilized output); a power supply (containing the necessary rectifiers and regulators for excitation of the transmitter); and an operational analyzer (which eliminates the need for external calibration and test equipment).

No air supply is required for instrument operation and a safety factor worthy of note is the use of a non radio-active power source. And, the detector output requires no further amplification. Specifications are as follows: Minimum bubble size which may be detected: .001 inch diameter. Maximum temperature, head assembly: 180°F. Maximum pressure, standard head assembly: 100 p.s.i. Material of construction, head assembly: 316 stainless steel. Standard head assembly size: 1 inch. Fluid viscosity range: 1-30,000 centipose. Maximum distance between head assembly and amplifier: 20 feet. Line voltage: 117 volts plus or minus 10 per cent, 60 cycle, 75 watts. Output: 0 to 4 milliamperes into 2500 ohms (3 to 15 p.s.i. extra optional) amplifier response time: less than .1 second for 63 per cent. Literature is available from the Taylor Instrument Companies, Rochester 1, N. Y.

Live Bottom Bin Also for Outdoor Use

The availability of a type live bottom bin designed to act as a cold caustic soak tank has been announced by Sprout, Waldron & Co., Inc., Muncy, Pa. The unit is claimed to be completely liquid-tight and is designed to withstand the static pressure exerted by a full head of liquid within the tank.

The first unit of this design is now being installed at the Augusta, Ga.



mill of Continental Can Co. Paper Products Group. It will be used to assure uniform and thorough impregnation of the chips in the cold caustic liquor, and to operate at 125 o.d. tons per day. Stainless steel construction is specified throughout.

The live bottom section of the bin consists of twelve 12 inch diameter stainless steel screws. These screws are driven in groups of three.

The live bottom bin is designed for installation outdoors without the necessity for additional shelter. Discharge from the live bottom is into a paddle type cross conveyor which continually mixes dilution liquor and chips to assure proper pumping consistency. This type of discharge permits the chips to be directed and metered to any location.

THE YARWAY VALVE MANIFOLD combines three valves in a single body—two providing suitable line shut-off and one that equalizes pressures to protect the instrument's internal working parts—together with a connection tap for calibration of the high pressure side of the system. It is furnished with either screwed or socket-weld end connections. Body and all working parts are of stainless steel. Write for Bulletin RI-1825 (Supplement C) to Yarnall-Waring Co., Chestnut Hill, Philadelphia 18, Pa.

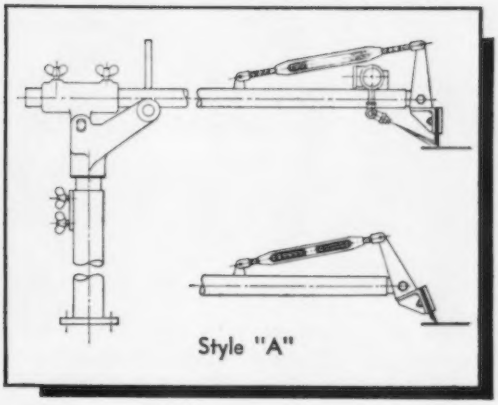
Digital Draw and Speed Indicators Are Transistorized

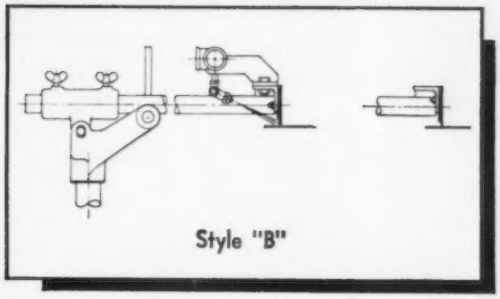
A series of transistorized Digital Draw & Speed Indicators has been developed by the Dynapar Corp., Skokie, Ill.

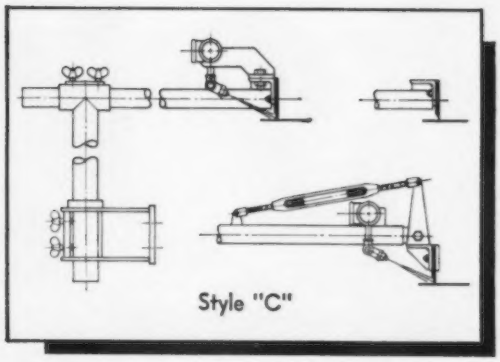
The instruments provide numerical indication of percentage of positive draw or roll speed (or both) to any required accuracy, usually .01 per cent. To guard against complete failure, an optional alarm system can also indicate percentage of negative draw.

Important advantage is that highly skilled operators are not required—there are no operating adjustments. The Draw Indicator operates with

SANDY HILL
Ruler Edge Deckles







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Pulp Paper and Board Mill Maintenance

Based on actual in-plant experience and prepared by well known men in the paper industry, this 126 page book brings you in easy to read language procedures for plant maintenance of kraft mills, semi-chemical mills, bleach plants, fourdrinier and cylinder machines, stock preparations equipment, and other machinery used in pulp and paper making. Price $2.50.

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remote readout indicators located at up to 25 different roll positions in the mill. Operator merely presses push-buttons to read draw or speed. When incorrect percentage of draw or paper roll speed is observed, correction is then made by adjusting speed of drive rolls.

Main instrument and remote indicators read directly in illuminated

numerals, visible 25 or 50 feet away. Readings can be made anywhere from 1/20th to 1 second or longer (usually in ½ second). Automatic sequencing and printout can also be incorporated into system.

Magnetic pickups or Rotopulser sensing devices, also made by the company, are used to measure precise roll speed at each location. They convert rotational shaft speeds into corresponding digital pulses, which are fed to Draw Indicator for counting. This information is then relayed on command to the remote indicators for numerical readout.

Equipment is designed to operate continuously 24 hours a day under mill conditions of high temperature and humidity.

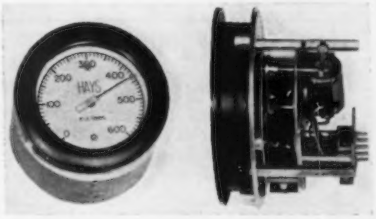
Another feature which is said to extend accuracy is a series of setup switches used to compensate for varying roll diameters, minute changes caused by wear. If the circumference of two rolls changes by as little as 1/1000th part, the Draw Indicator can compensate for it.

Remote Indicator Uses Electrical Transmission

An all-electric round dial Remote Receiver (Model 731) for remote indication of gas and liquid pressure, draft, differential pressure, flow, temperature, and liquid level is now available from The Hays Corp.

By utilizing remote electric transmission, the danger of high pressure and temperature lines at panel boards is said to be eliminated and impulse piping requirements are reduced to the short length needed between point of measurement and the transmitter. Speed of response is reported to be 2.5 seconds for full scale travel or better.

A three-wire transmission line is all that is required between the transmitter and the new receiver. A plug-in connector to the amplifier is its only external connection. Power supply to the amplifier is 115 v, 60 cycle, single phase, a.c., with a power



consumption of 50 watts. Transmitter power supply originates from the amplifier.

Sensitivity of the new receiver is described by Hays as 0.1 per cent of full range or better, with calibrated accuracy for flow being ± 1 per cent of full range scale. For low, medium or high pressure, and temperature, calibrated accuracy is ± 2 per cent of full scale range. Increased accuracies are available with special factory calibration.

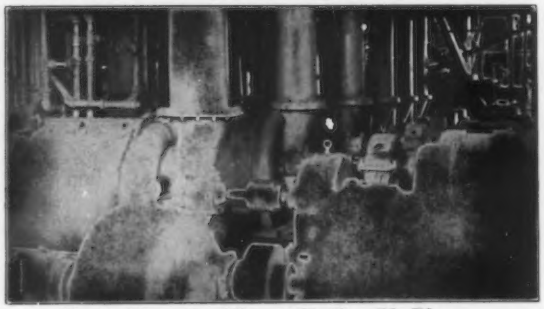
Three sizes to fit most requirements are offered; 4½-inch, 6-inch, and 8½-inch diameters. The model is a round dial type with a 270-degree scale for maximum scale length.

Complete information is available from The Hays Corp., Michigan City, Ind.

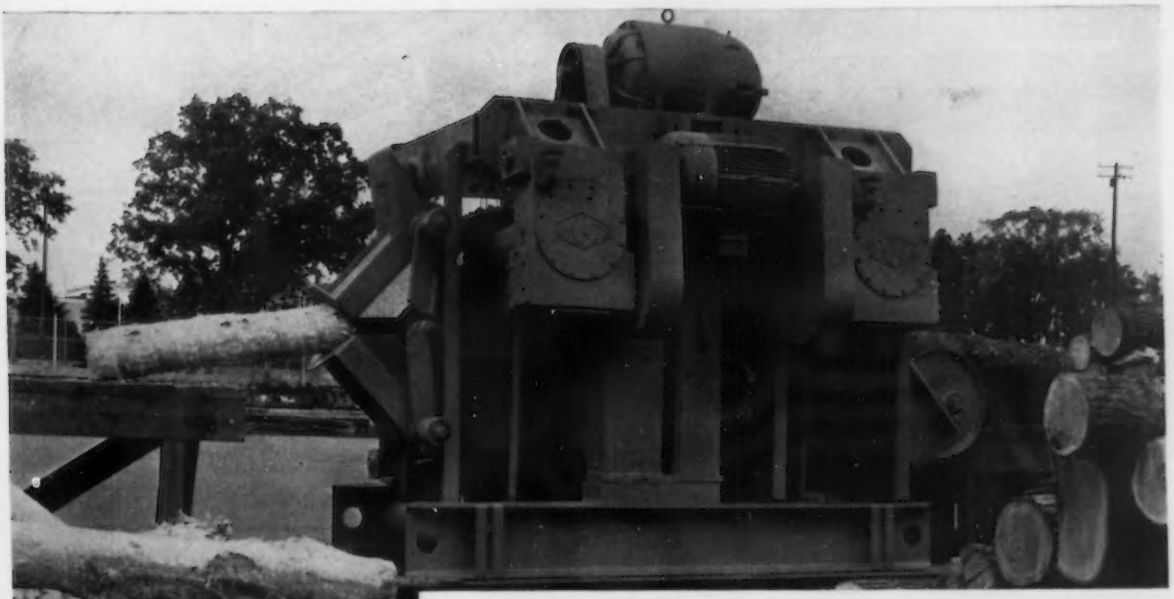
Three APMEWS Replaced a Big Room Full of Flat Screens in Bond Paper Mill

"Apmew centrifugal pulp cleaners & screens have now been installed and are working very satisfactorily." Centrifugally cleaner, more salable paper is being produced for big profits.

Occupy 10 feet by 30 feet—SAVE 81 feet by 96 feet



APMEW, Inc., P. O. Box 1, Glens Falls, N. Y.



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The S20-5 delivers a dependable high annual production rate of cleanly barked logs at very low maintenance and operating costs. This dependability, due to its extra-rugged design, is maintained with frozen crooked hardwood. Present installations average 250 cords/day with reported maintenance costs of 3 to 4 cents/cord, on logs in the 3″ to 19″ diameter range, down to 5′ in length.

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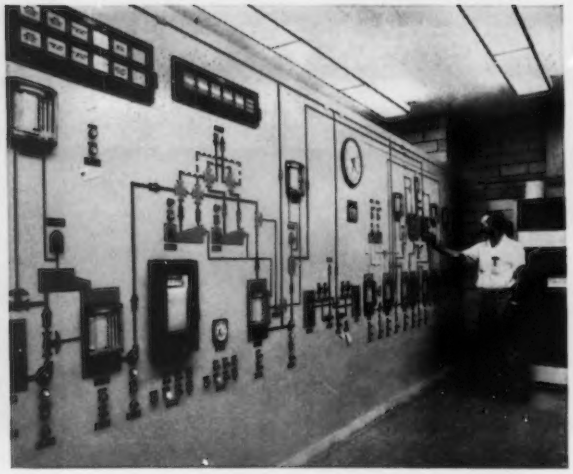
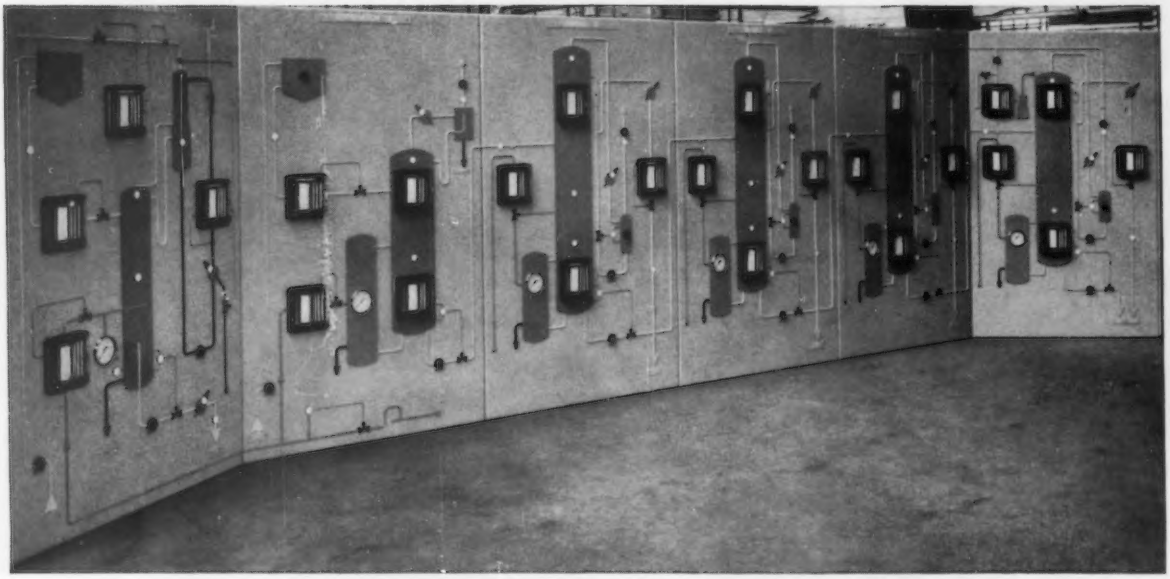
One of several TRANSCOPE *panels in a large petrochemical plant in the South West.*



Part of an extensive TRANSCOPE *installation in a famous southern paper mill.*

"FINEST OPERATOR'S



TRANSCOPE Recorders on a graphic panel in a benzol distillation plant in England.

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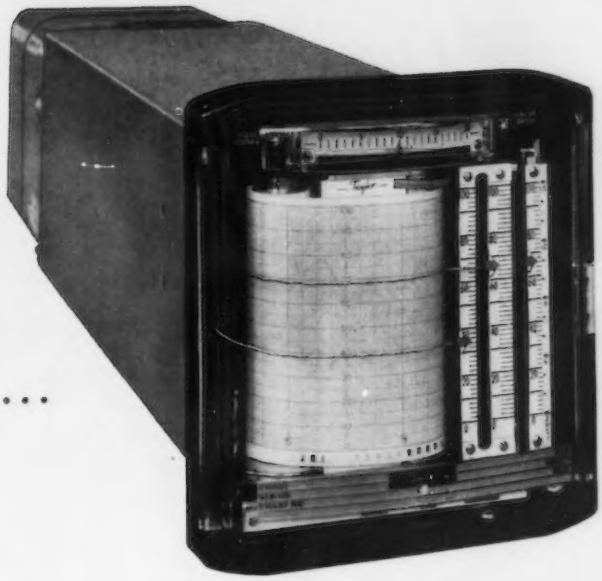
No other recorder

puts so many features

in so little panel space . . .



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The Taylor TRANSCOPE® Recorder

It is now generally recognized throughout industry that the Taylor TRANSCOPE (90J) Pneumatic Recorder is the finest ever built for modern miniature-instrument panels. Of equal importance, if you're in the market for such instrumentation, the 90J will not be obsoleted for many years to come. In fact user reports, after two years of field service, are so outstandingly complimentary that we believe the name TRANSCOPE will rival that of the now famous 20-year-old Taylor FULSCOPE* line for obsolescence-free dependability. Here are some of the reasons why the 90J is going to be the most imitated recorder:

Servo-Operated Pens with 150 times greater power, assure unprecedented accuracy of records.

Unconfused Readability because chart record, pen and set-point are side-by-side. Target-type pens and pointers are easiest to see, particularly at a distance. 4″ chart reads from left to right on rectilinear coordinates.

Optional Front-of-Panel Settings let you make control adjustments easier, quicker and better . . . from the front of panel . . . while recording!

Stays on Automatic Control while the plug-in recorder slide is removed for inspection, providing continuous fully automatic control.

Complete Indicating Control Station while recorder is removed. Optional switch lets horizontal gage at top of recorder show either process variable or output to valve.

Receives Three Variables to be recorded or indicated; unique, plug-in Set Point Transmitter allows continuous control. Available with Process Alarms with Memory Pointers; Automatic-to-Manual switching; Cascade or Process-output Switch, and many other features . . . all in one compact case.

*Reg. U.S. Pat. Off.

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Taylor Instrument Companies, Rochester 1, New York, and Toronto, Ontario.

MEAN ACCURACY FIRST

PJT NEW LITERATURE

Brushless Rheostat

Contains complete specifications and price list on the Regohm transducer. A series of step-by-step drawings show how the unit can change 1/10th inch of mechanical motion into stepless control of up to a quarter-kilowatt of power. Bulletin. Electric Regulator Corp., Pearl St., Norwalk, Conn.

Caterpillar Construction Equipment

Provides model views and brief specification on their complete line of earth-moving equipment and its diesel engines. Form D942. Caterpillar Tractor Co., Peoria, Ill.

Control Panel Design

Discusses important facts to be considered in designing an efficient control panel. Contains photographs of two different types and a graphic representation of a remote control system, as well as a list of organizations that publish codes and standards relating to control panel design. Fact File ER-G-8. Fuller Co., Catasauqua, Pa.

Deloro Alloys

Bulletin SP-13 tells how these alloys meet common types of corrosion. Tested and Proved bulletin covers use of anti-abrasive and anti-corrosive alloys in the pulp and paper industry. Deloro Stellite, Belleville, Ont., Canada.

Naro-Aisle-Stack Lift Truck

Describes this new fluff tester which lost warehouse space and expands warehouse capacity up to 50 per cent through better utilization of existing storage space. 18p Booklet. Towmotor Corp., Cleveland, Ohio.

Centralized Systems of Lubrication

Contains information on the complete line of centralized systems of lubrication, and illustrations of typical applications. Bulletin 26-T. Farval Div., Eaton Mfg. Co., 3300 E. 80th St., Cleveland 4, Ohio.

Viscosity Stabilizer

Describes an improved viscosity stabilizer that drastically reduces the "free water" in paste formulas for corrugated box manufacturing. Also includes field tested formulas for using No. 822 with corn starch and tapioca flour in numerous ways. Bulletin. Morningstar-Paisley, Inc., 630 W. 51st St., New York 19, N. Y.

Watertight Masonry

Outlines major considerations in designing tight masonry walls and describes the role played by Omicron mortarproofing in providing a cohesive plastic mortar to aid good workmanship and its positive water reduction to minimize shrinkage. Bulletin O.M.-8A. Master Builders Co., Cleveland 3, Ohio.

Overhead Conveyor System

Covers in detail the type and construction of the power overhead; the inverted overhead; the piggy-back and the power and free. An eight page booklet describes the Econ-O-Lift which is a gentle action bucket or tray type carrier having the Econ-O-Spacer. Brochures. Econ-O-Veyor Corp., 224 Glen Cove Ave., Glen Cove, N.Y.

Packaging Machinery

Describes line of packaging machinery that manufacturer states "does more and takes less space to do it." 6-Page, 3-Color Folder. Thiele Packaging Machinery Co., 1000 Berry Ave., St. Paul 14, Minn.

Rubber Expansion Joint—Flexible Pipe

Covers modern line of custom-made rubber expansion joints and flexible pipe. "Gen-Lok" flanged flexible pipe assures perfect bolt hole alignment in both old and new installations alike. Catalog 850. General Rubber Corp., 57 Summit St., Tenafly, N. J.

To Meet the Continuing Challenge

Deals with the scope of research and development invested by the company in its program of continual product improvement. Form DE936. Caterpillar Tractor Co., Peoria, Ill.

Torque-Arm Reducers and Screw Conveyor Drives

Presents an expanded line of these reducers for mounting on shafts of driven machines and reducers for flange mounting, vertical shafts, right angle drives and screw conveyor drives. Bulletin A692. Dodge Mfg. Corp., Mishawaka, Ind.

High Velocity Dryers

Gives technical data on three new models which may be manually or automatically controlled and are extremely flexible in operation. Bulletin HV-501. J. O. Ross Engineering Div. of Midland-Ross Corp., 730 3rd Ave., New York 17.

Joy Series 200 Idler

Contains complete specifications, a detailed description of construction features, installation photographs, application instructions and an explanation of advantages. Bulletin LD-111. Joy Mfg. Co., Pittsburgh 22, Pa.

Molykote Type G

Tells how Molykote G reduces galling, seizing and metal pickup in high pressure and high temperature applications. Also discusses typical applications and gives instructions for applying the lubricant. Bulletin 126B. Alpha-Molykote Corp., 65 Howard Ave., Stamford, Conn.

"Old as the Hills"

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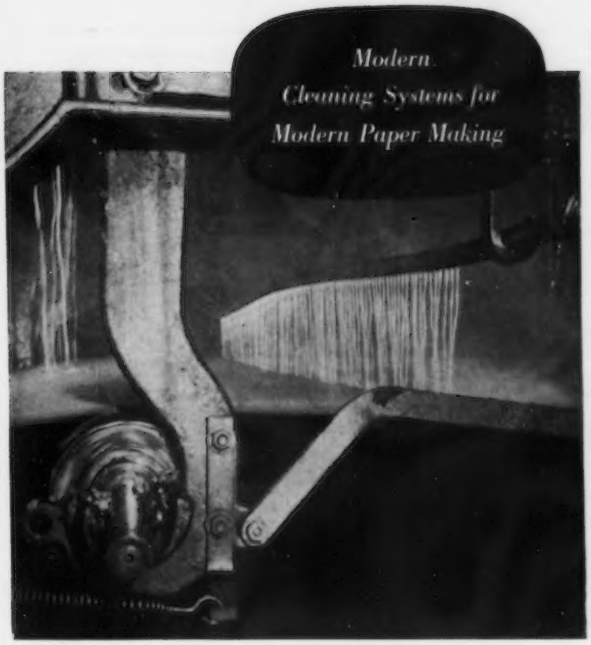
R. T. Barnes, Jr., 1523 Chapin Ave., Burlingame, Calif.

Pulp & Paper Mill Accessories Ltd. Box 903 Montreal, Quebec

E & M Lamort Fils, Vitry-le-Francois (Marne) France

Joseph Winterburn Ltd., Bury, Lancs., England



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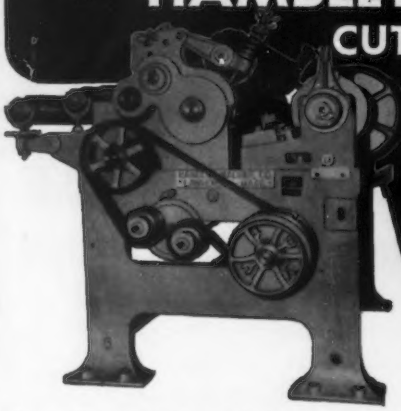

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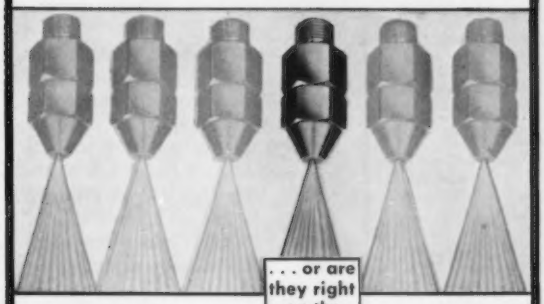

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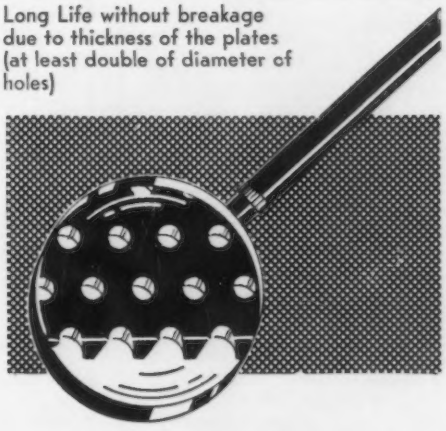

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1—Potdevin 1 & 2 ply tuber; 5¾" to 14" face; 10¼" to 33" pull; w/motor & elec eye
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2—3000# Downingtown w/60" face x 67" dia roll; like new

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1— 24" Waldron Coater & Embosser
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3—Sandy Hill 81" trim single cyl. Tissue
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2— 63" face x 36" dia w/rubber couches
1—104" face x 36" dia
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Downingtown single cylinder; 99" face x 48" dia.; 18" dia. couch

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2— 84" face w/accessories

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18— 90" face; complete section
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40—118" face; complete section
1—120" face
1—160" face

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10—123" face w/gears, frames & bearings
1—128" face

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1— 6' face x 3' dia Dorr-Oliver
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1— 4 plate Tailing Screen

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1—Dilts 16 ft. complete w/125 h.p motor, elec. hoist & oil pump

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1—100 hp GE; 440 v; 695 rpm
1—300 hp West; 2200 v; 503 rpm
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1—De Laval 100 h.p. steam turbine w/reducers

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3—600 ton hyd. Pulp Presses
4—3 pocket grinders for 2' wood
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1—Shartle 8 x 20 Triplex
1—Shartle 10 x 16 Duplex
23—Centrifugal Stock and Water Pumps

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1— 36" Kohler Automatic 2 arm unwind reel
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1—109" two bowl upright
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1—24" Downingtown Weiner; new
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1—124" x 30" Farrel w/crowning device
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Distributor—Stainless Steel
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20 Misc. Sizes Dwngs Available

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71 Miscellaneous sizes. Drawings available

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72 Miscellaneous sizes. Drawings available

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24" Maximum Rewind Diameter
3— 42" Cameron Type 6
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1— 60" Kidder Model SH Low Bed
1— 72" Beloit Shear Cut
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1—136" Cameron Type 18; A-F Brng
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1—110" Langston
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1—120" M & W two drum w/75 h.p. drive
1—120" Langston
1—136" Langston Type DA Shear Cut; A-F

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18" Maximum Rewind Diameter
1—72" Cameron type 26-3A

24" Maximum Rewind Diameter
2—48" Langston Shear Cut

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1—105" face x 19" dia.
1—126" face x 22" dia.; complete section
1—134" face x 20" dia.; A-F Brng.

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2— 38" Seybold w/motors
1— 57" Seybold Precision
3— 65", 74", & 84" Seybold Daytons
1— 84" Seybold 12Z w/air tables

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7—H-4, ½H-5, & H-5 Nash
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3—L-5 & L-7 Nash
6—#2, #3, #4, #6 & #7 Nash Hytors
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4— 72" w/single press section
1— 62" w/single press section

YANKEE DRYERS
1—132" face x 10' dia Beloit; 35 psi

Help Wanted

Help Wanted

Help Wanted

WANTED

COMBINED PURCHASING/TRAFFIC DEPARTMENT HEAD

For Kraft linerboard mill under construction at Counce, Tennessee. Located in TVA lake area.

Experience in both Purchasing and Traffic is desirable. Will consider applicants with primary experience in Purchasing if they have some background in Traffic.

Southern linerboard mill experience desirable.

Growth opportunities for qualified man.

TENNESSEE RIVER PULP & PAPER COMPANY

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St. Croix Paper Company
Woodland, Maine

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For two pulp mills and two fine paper mills with headquarters in Bangor, Maine. Supervision of Industrial Engineering Department personnel with responsibilities devoted primarily to methods improvement and incentive pay administration. Paper mill experience essential. Attractive salary commensurate with ability and experience. Apply giving education, experience in the paper industry and other personal data. Replies confidential.

Eastern Fine Paper and Pulp Division
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P.O. Box 930, Bangor, Maine

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Immediate position open in Research and Development Department of small absorbent specialty mill located in the midwest. Prefer man with degree in chemistry and three years of paper mill experience. Knowledge of saturating papers and saturating resins desirable. Write to Box 60-77 care Paper Trade Journal.

M-9

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EXECUTIVE - WORK MANAGER

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With extensive and successful experience in the performance and management of cylinder and fourdrinier mills. Correspondence invited with progressive companies. Address Box 60-63, care of Paper Trade Journal.

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LOOK through the columns of the CLEARING HOUSE

FOR SALE

Two Great Northern pocket grinders 54 x 34 with Waterous controls, one 3000 HP Westinghouse synchronous motor, 2 Impco #3 pulp screens, 2 Sandy Hill Voith screens.

All above equipment purchased new 1945, used less than one year. Equipment available for immediate shipment. Photographs and prints available.

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M-2

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MAINTENANCE DRAFTSMAN—Five years experience in Eastern specialty mill, desires to relocate in Southern California. Address Box 60-70 care Paper Trade Journal. M-2

TECHNICAL GRADUATE — with six years technical control and service with leading Glassine and Greaseproof Mill. Desires more responsible position. Address Box 60-76 care Paper Trade Journal. A-25

Wanted

WANTED FOR EXPORT
Fourdrinier machine, trim 84", speed 500 fpm. To manufacture lightweight Kraft specialties. Reply in Detail to Box 60-66 care Paper Trade Journal. A-18

MACHINERY WANTED
Approx. 5 ft. dia. x 8 ft. lg. plain or vacuum type filter-washer for 100 T. cap. Impco or Oliver preferred. Reply Box 60-73 care Paper Trade Journal. A-18

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A used Bauer double revolving disc refiner for treatment of semi-chemical pulp. Stainless steel parts in contact with pulp. Equipped with two 400 H. P. induction type motors. Usually classified as No. 410-1. Address Box 60-69 care Paper Trade Journal. M-2

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WANTED
STANDARD BRIGHTWOOD BOX MACHINE
top feed, now over 12 years old, good condition. Box 60-77 care Paper Trade Journal. A-18

WANTED—Enclosed Right Angle Paper Machine Drives—all sizes and horsepowers. Address Box 60-68 care Paper Trade Journal. M-2

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For Sale

FOR SALE
Complete PULP TESTING UNIT
Made by Hermann Manufacturing Company and consisting of the following:
1—DISINTEGRATOR
1—HYDRAULIC PRESS
1—SHEET MACHINE
All equipment NEW and never used.
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For Sale
1—Dryer Section consisting of 18—36" x 76" Dryers complete with Frames, Gears and Bearings.
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9—36" x 84" Dryers, Frames, Gears and Bearings.
The above dryers maximum operating pressure is 50 P.S.I.G.
1—Laminator capable of handling sheets or rolls 52" width Perry Liner, 11 rolls, steam heated, Serial #322, Moore & White Simplex Sheeter with Automatic Layboy, Multiple roll backstrand, separate unwind for paper.
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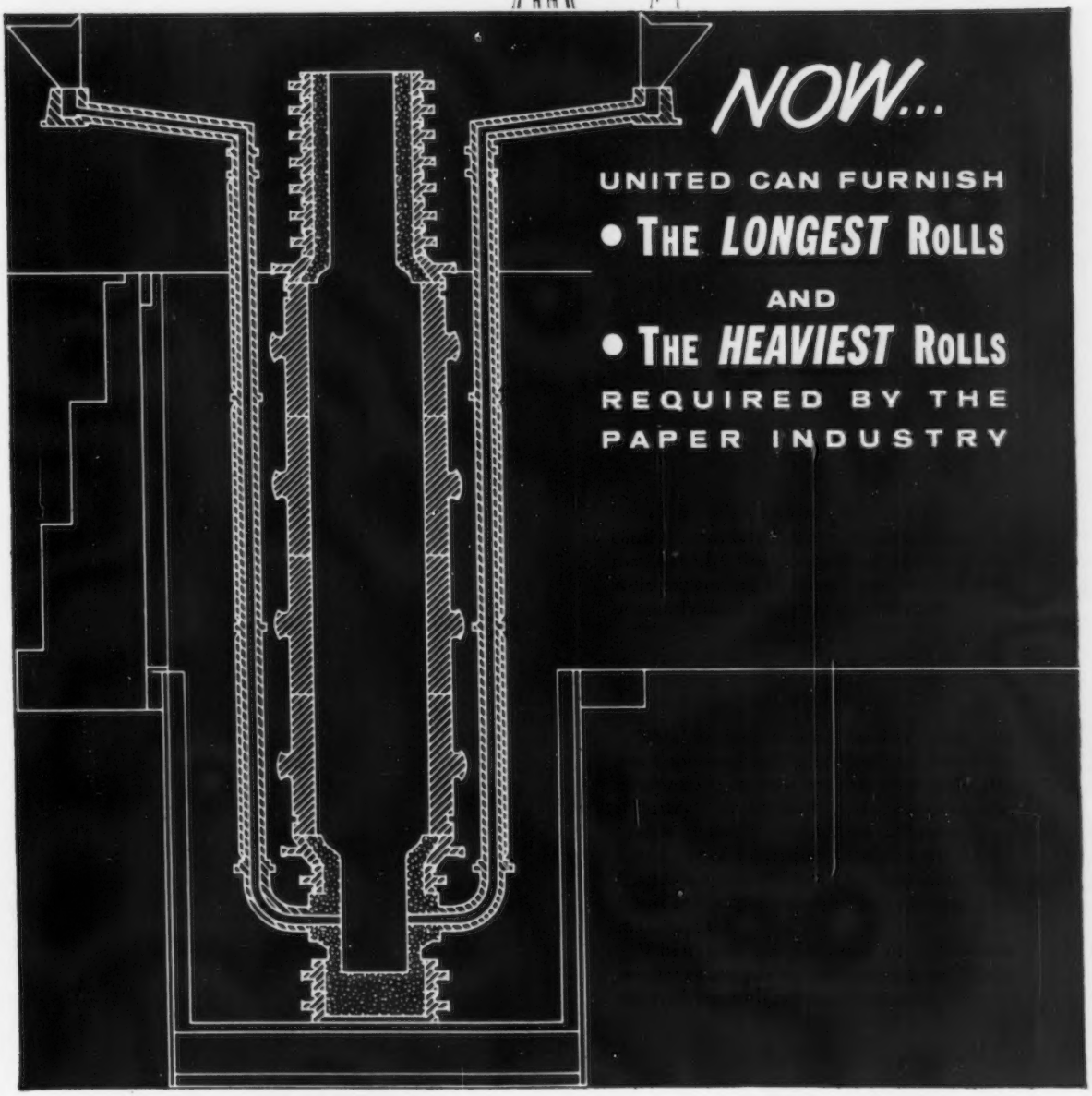

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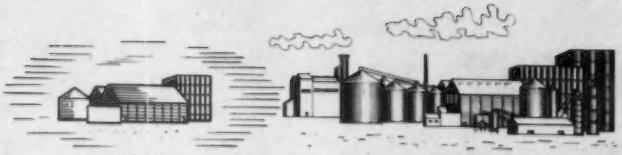

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